The Electrical Industry's Weekly Magazine

September 10, 1956

Electrical World

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Ted Mack TV Show Triggers Union Electric's IMPACT Ad Campaign

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FIELD INVESTIGATIONS result in considerable data which are employed in both analytical and laboratory studies. New General Electric methods of analysis permit experimental efforts to be compared with actual effects of extremes in altitude, wind, and temperature.

What's being done about radio interference?

STUDYING FIELD NOISE TEST DATA in a radio-noise-free shielded room in the General Engineering Lab in Schenectady are Dr. G. E. Adams, Analytical Engineering; N. R. Schultz, Engineering Planning and Development; H. A. Gauper, Jr., General Engineering Laboratory.

BETTER CONDUCTOR ARRANGEMENTS are sought in another, larger shielded room in General Electric's High Voltage Laboratory in Pittsfield Mass., by Dr. Tseng-Wu Liao, J. E. McDonough, and W. A. Keen, Jr.

New methods of analysis may lead to improved accuracy in planning high-voltage transmission systems

As electric utilities respond to demands for larger and larger blocks of power by favoring higher transmission voltage, it's natural for system design engineers and public relations men to ask: how accurately can radio noise be predicted for new line designs at various weather and atmospheric conditions?

For many years, this problem had been researched by utility companies and manufacturers. However, there had been little correlation between lab tests and actual field experience because of the problem's complex variables.

New General Electric methods of analysis not only permit such correlation, but now make it possible to accurately predict interference of actual lines from lab tests of samples of conductors.

Dual conductors, for example, had considerably lower interference levels than conductor surface voltage gradients would indicate. Recent G-E research fully explains this phenomenon, and results correlate with field experience.

Since radio interference is primarily a function of weather and time on a given line, spot testing the actual line for reliable data is very difficult. Thus laboratory techniques and accurate methods of analysis become essential to compare effects of line construction, conductor size, phasing arrangements, etc. so that utilities have a reliable indication of the characteristics of a proposed transmission line.

Continuing research by General Electric promises to speed progress on the radio interference problem and help utilities meet expanding loads without disturbing high public relations standards. Write for "Recent Radio Interference Investigation on High Voltage Transmission Lines," and "Relationship between Corona and Radio Noise on Transmission Lines, Part I," General Electric, Sec. 301-321, Schenectady 5, N.Y.

MORE POWER TO AMERICA

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COMING NEXT WEEK—In its 7th Annual Forecast Issue Electrical World will tell the industry what's ahead for the coming year and will supplement this with additional data until 1970.

EXCLUSIVE NEWS:

WESTINGHOUSE METAL-CLAD SWITCHGEAR . . .

FIRST 75 MVA MAGNETIC AIR BREAKER—5-CYCLE INTERRUPTION

A jump ahead of demands on modern switchgear, Westinghouse announces an air circuit breaker rated at 75 MVA interrupting capacity. And more—5-cycle operation means fast arc extinction.

This new 50-DH-75 breaker offers:

1. The long-proved, exclusive Westinghouse De-ion® arc interrupter, the fastest, most efficient method of arc extinction ever devised.

2. Main contacts are self-aligning, multiple line, butt type.

3. New lightweight, hinged-type arc chute that has improved arc interruption. Inspection of contacts is now even simpler—remove just one bolt and tilt back arc chute.

Specify Westinghouse metal-clad switchgear—now even more versatile, faster, more dependable. Get in touch with your Westinghouse sales engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60888

John Kozlovic, Design Engineer, High-Voltage Air Circuit Breaker Engineering Section, discusses features of the first 75 MVA magnetic air breaker. New Westinghouse air breaker is rated 75 MVA at 4160 volts, 50 MVA at 2400 volts interrupting capacity; 1200 amperes continuous; 5-cycle interruption.

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TELEVISION AND RADIO!

EDITORIALS

Commercial Cooking Is Hot Load

Commercial cooking can no longer be looked upon as just a promising load building opportunity. Today it is solid business.

This is apparent to everyone who read Electrical World's second survey in a recent issue (Aug. 27, p 36). Companies like Appalachian Electric Power and Pennsylvania Power & Light are grossing $2 million and more each year from this single load. Southern California Edison Co added nearly a half-million dollars of cooking revenues last year.

And the substantial returns are by no means limited only to utilities with large prospect lists. Kentucky Power Co, with only 600 food service accounts to draw on, worked its market for $72,000 in new commercial cooking business last year. Similarly Gulf States Utilities drew $134,000 in new money from only 1,080 prospects.

Cooking kwhr sales for the industry this year likewise look good. Already they're about 25% ahead of '55, according to one equipment manufacturer's estimate.

Like space heating, commercial cooking offers a high concentration of kwhr from few installations. A fully-equipped all-electric kitchen can put a load on a utility's lines of anywhere from 100 kw for a large restaurant to 300 kw or better for a hospital. To a single company with 2,300 food service customers (the average for the utilities in EW's survey) this means a total potential of:

- 69,000 kw demand (based on a conservative average of 30 kw for each food service customer). This is the total capacity of a good-sized turbine generator;
- $1¾ million in annual revenues (at $25 per kw).

And, happily enough, commercial cooking diversifies well with other classes of business, has a good annual load factor.

Utilities which go after the load know this. A survey of 34 utilities (EW July 23, p 97) shows cooking is getting a modest but steadily increasing share of the utilities' commercial promotion dollar—up 43% since 1940. Meanwhile, several other commercial power applications are suffering budget cutbacks.

With at least 533,000 food service outlets in the U. S. whose cooking requirements could total at least 15 million kw, the "poor little rich load" is no longer so poor or so little. As for how rich it is, the figures above speak for themselves.

Is the Industry Wasting Steam?

"Is there a public relations man somewhere in the industry who can find glamor with which to thrill the public in a multi-million dollar steam plant bringing a higher standard of living to our homes?"

This question ended in an editorial in our July 30 issue deploring the lack of attraction such plants have to the public which finds hydro plants glamorous.

That public relations man may be at Interstate Power Co. In 1955 the company sponsored 53 plant tours taking several thousand persons through its five steam-electric stations. The plant visitors included all kinds of customers: municipal officials, business men, students, scouts, teachers, and just plain customers.

And our informant (not the PR man) closed his letter with this thought-provoking sentence:

"The glamor, the thrill, the educational value, and the story of private enterprise are all there (in a steam plant) if we see fit to use them."

Beauty Parlors—Tomorrow's Information Centers

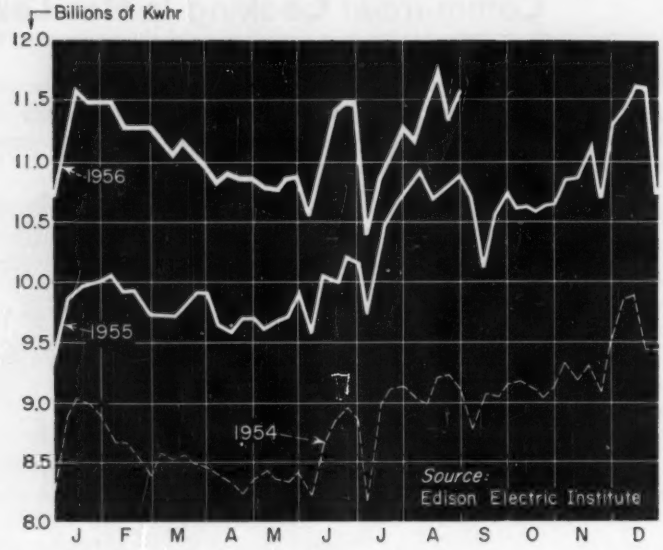
Barber shops and beauty parlors have long been recognized as "information" centers. Now the Democratic National Committee is planning to use the beauty parlor as an information medium in the coming election. An advertisement in the August issue of its "Democratic Digest" advises:

"For only $2.50 you can give a gift subscription of the DEMOCRATIC DIGEST to your favorite beauty shop.

"Have your friends and neighbors reading the Democratic facts that will have them voting with you on election day."

Electric companies could well copy the idea. Beauty parlors certainly would make perfect outlets for company literature of interest to women. And it would be excellent to extend this free literature service to barber shops, doctors' offices, dentist offices, and other offices needing reading matter.

ELECTRICAL WEEK



OUTPUT

Week ended Sept. 1
11,565,000,000 Kwhr
Up 8.0%

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 7.1%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Sept. 1	+8.0	+10.8	+8.6	+10.1	+11.0	+5.4	+10.6	+11.3	+3.7	+3.2
Aug. 25	+4.0	+11.1	+3.7	+3.0	+2.0	+3.0	+2.2	+11.7	+2.8	+8.0
Aug. 18	+9.1	+11.0	+5.2	+8.8	+11.8	+6.2	+24.7	+15.3	+6.1	+5.2

Seasonally Adjusted Index 218.3 Week Ago 213.5 Year Ago 202.1

Here are the issue's highlights . . . Who will get St. Lawrence power? Contracts now in the making may raise new controversy . . . Utilities view tight money with apprehension . . . Niagara Mohawk plans board meeting to discuss terms of a proposed agreement drawn up by New York Power Authority in which Authority would swap block of power for use of utility's land and water rights at Niagara . . . Ozarks Rural Electric Co-op asks Arkansas Public Service Commission to halt a Southwestern G&E line in a state-law hassle . . .

Arkansas P&L's "Ham" Moses retires to resume law practice . . . French engineers plan to harness Rance River tides by 1961 . . . Pacific P&L proposes rate adjustment to encourage space heating load . . . Mobile clinic checks TVA's health . . . Holyoke WP fixed a turbine shaft in 4 days . . . Cartwheel Caleb helps Toledo Edison minimize accidents . . . LP Gas: The bottled curse . . . When Washington WP takes over from PUD, Stevens County goes on appliance buying spree . . . Is reactor safety a coming campaign issue?

"Back-door approach to socialism" is the label placed by Arizona Republicans on a proposed state-owned power plant. Arizona Power Authority begins hearings Sept. 17 on its proposal to build a 30,000-kw steam station.

An Oregon circuit court judge dismisses a county grand jury indictment of Idaho Power. The indictment charged that the utility started to build Brownlee Dam at Hells Canyon without license from Oregon Hydroelectric Commission. The judge ruled that company's FPC license "is paramount over the laws of the state of Oregon for the construction and operation of the dam."

Public Service Electric & Gas places an order with General Electric for a 300,000-kw turbine generator. It will be a cross-compound unit consisting of two 3,600-rpm shafts, each having identical generators.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . United Automobile Workers Union and two other unions file petition with Atomic Energy Commission for a public hearing into safety of Power Reactor Development Corp's proposed nuclear plant outside Detroit. AEC asks PRDC to reply by Sept. 15. Then it will decide whether hearings will be held. President Eisenhower declares that he personally has no objection to such a hearing. He says he knows that AEC officials spent a long time reviewing plans for the reactor to make certain that there will be no accidents which would endanger the public . . . **AEC has two new programs to help universities and colleges train nuclear engineers.** The Congress-okayed programs provide: (1) grants as high as $350,000 to individual schools toward cost of atomic research equipment; (2) loans up to $50,000 for purchase of nuclear materials . . . Federal Power Commission postpones from Sept. 11 to Oct. 15 the hearing on complaint by Massachusetts Department of Public Utilities against New York State Power Authority. DPU is protesting against Authority's refusal to allocate St. Lawrence power to Massachusetts.

Bonneville Power Administration warns industrial customers that continued low streamflow may force some cuts of interruptible power by end of September.

Dayton Power & Light's area development department discloses that establishment of new industries and expansion of existing plants in its area during past five years has added 11,000 jobs and $65-million payroll annually.

Iowa-Illinois Gas & Electric files suit to stop Rural Electrification Administration from financing construction of a Central Iowa Power Cooperative power line. The line would enable the co-op to serve an industrial firm in Lehigh, Iowa. The firm is being served by Iowa-Illinois G&E.

Cincinnati Gas & Electric receives permission from State Utilities Commission to cut rates to large-scale residential users of electricity. The company says that 201 of its 64,000 residential customers are affected.

General Electric hikes prices 10% for repair and reconditioning of most motor classes up to 499 hp and distribution transformers of 167 kva and below.

ABOUT PEOPLE IN THE INDUSTRY

Pacific Northwest Power Co hopes to start construction of its 1,183,000-kw Mountain Sheep-Pleasant Valley projects by December, declares **Kinsey M. Robinson,** president of PNP and Washington Water Power, in talk to N. Y. Security Analysts. FPC will resume licensing hearings for the $217-million project on Sept. 24. License is opposed by the public-power group, National Hells Canyon Association.

John C. Arnell, chairman of EEI's Industrial Relations Committee, **reports heavy advance registration** for the group's 9th Annual Round Table Conference. It will be held Sept. 17-19 at Drake Hotel, Chicago. Arnell says that over 300 operating and industrial relations personnel will attend a series of "how-we-do-it" sessions keyed to the theme, "Preparing Today for Tomorrow's Personnel Problems."

More News About People page 36

Who Will Get St. Lawrence Power?

Who is going to get the United States' share of power that will be produced at the International Rapids section of the St. Lawrence River?

This question already has involved four groups in vigorous discussions, and may lead to two controversial New York State Power Authority contracts with Niagara Mohawk Power Corp and Reynolds Metals Co.

Representatives of Niagara Mohawk, Reynolds, the Power Authority, and Gov Averell Harriman's office already have been meeting to thrash out acceptable terms. Tentative contracts were to be formulated by Sept. 7, and these would be thrown open for discussion at a public hearing scheduled for Oct. 10. If the Power Authority accepts the contracts, they then will be sent to Gov Harriman for signing into law.

Contracts Being Formed

As EW went to press, neither contract had been put into its final language. However, it is understood that one tentative contract would allocate to Niagara Mohawk 143,000 kw for distribution to rural and domestic customers within a 150-mile radius of the Barnhart Island station, near Massena. The tentative contract would require the utility to sell this power at lower rates than it now gets for its own power in the area. Moreover, the contract would provide for withdrawal of part of this power in the future if necessary to serve preference customers.

With respect to the contract with Reynolds Metals Co, it is understood that the company would be allocated 235,000 kw—more than the Authority already has agreed to supply Aluminum Corp of America for its Massena plant.

Objections to both contracts already are foreseen. Niagara Mohawk is expected to say that the amount of power allotted to it is too little, totaling only 20% of the 735,000-kw which the St. Lawrence project is designed to produce for American use. It is also thought that the utility will say the distribution area is too small—that less than a tenth of the state's population lives in this area.

But replies to these arguments are expected to bring out that the power granted Niagara Mohawk would constitute a substantial proportion of all power used by rural and domestic customers in the distribution area, and that it would not be economical for the utility to transmit the power over greater distances.

The proposed contract with Reynolds Metals Co may generate strong opposition from parties who believe the St. Lawrence power should be given to communities for their own use and area development. Reynolds currently plans to build a plant in the area, so the question basically comes down to this: How should the power be distributed to benefit the area the greatest?

If Reynolds is given 235,000 kw, then over half of the St. Lawrence power will be going to it and Alcoa. However the latter, in negotiating its contract, showed that a plant employing 6,000 persons would have to be shut down if it did not get enough power to replace its own power facilities that will be flooded out by the project. Presumably if Reynolds does not get a hefty block of power, it may decide to build its plant elsewhere and potential employment for many persons in this area will be lost.

Ohio May Form Atom Group

Special conference on nuclear energy urges that state laws be patterned after national laws to cut conflicts

The State of Ohio recently held a one-day conference on Peace-Time Uses of Nuclear Energy and Radiation Safety. The up-shot of the meeting was the passing of a resolution urging Gov Frank Lausche to name a State Atomic Development Advisory Committee.

This committee would work with the governor in formulating state laws pertaining to the use of atomic energy.

Many of the 650 industry representatives at the conference urged that state atomic laws be patterned after federal regulations that have been formulated and enforced by the Atomic Energy Commission. This would give the state effective laws on such matters as safety and health measures, insurance, transportation, and use of nuclear energy. It would also avoid conflict between federal and state statutes.

Principal speaker at the meeting was Louis H. Roddis, deputy director of AEC's Reactor Development Division. He predicted that "within perhaps 10 to 15 years," nuclear power plants "will be competitive in costs with the most modern conventional plants."

He declared that by 1970 about 25-million kw will be produced annually in U. S. nuclear plants. This will be about 8% of national capacity, he said. But "much of this nuclear capacity, to be sure, may be uneconomic," he added.

Roddis estimated that nuclear capacity will soar to 80-million kw or 20% of national capacity by 1975. The additions during 1970-75 "will, for the most part, be competitive in costs," he said.

Dr Lawrence Hafstad, vice president of General Motors Corp research, said it is almost necessary for industry to have AEC as a partner on a major nuclear energy project. This especially is true in view of costs involved, and the ample fuel sources and efficient plants now available in the U. S. Little immediate chance exists for appreciable returns on nuclear investments.

The Aug. 29 conference at Columbus was sponsored by five Ohio State Departments: Public Health, Industrial Relations, Commerce, Workmen's Compensation, and the Industrial Commission.

Governor Lausche said the meeting was held to foster a better understanding of the industrial uses of nuclear energy. He also wanted industry representatives to discuss problems concerning protection of workers and communities.

Money Rate Rise Seen

Electric utility industry, with growing demands for expansion and dependent on outside financing, views prediction of tight money squeeze with apprehension

Money rates will continue to go higher. This is the opinion of government and other officials. They think money might even become tighter as business rolls along at its present pace.

These higher rates will pose a problem to all segments of the American economy, especially to the electric utility industry. Dependent on the need for outside financing, since only a minor portion of its total requirements can be raised from internal sources of cash, and being faced at the same time with the ever-expanding demands for its services, the electric utilities view the present rise in money costs with some apprehension.

The $64,000 question is "Will interest rates go up, stay at the present level or is there any likelihood of their going down?" It is clear that the expansion of the economy has put a severe strain on the availability of funds on the one hand, while on the other the fear of the incipient inflationary trend has made the Federal Reserve Board increase its discount rate.

Tighter Money Wanted

The Administration and the FRB, which by law is independent of Executive Department control, are showing every sign of agreement on the need for tighter money.

There are at the present moment no doubts or disagreements as to the need for higher interest rates being expressed by such officials as Arthur Burns, chairman of the President's Council of Economic Advisers, or Secretary of the Treasury George M. Humphrey.

However last April when the FRB raised the discount rates, these men and other key administration spokesmen, said they didn't agree. They expressed doubt that inflation was a threat. They expressed the wish that the FRB wait awhile before tightening money.

Now the FRB has raised discount rates again—from 2¾% to 3% in nine of the district Federal Reserve banks. This is the highest level since 1933 when the New York bank had 3% rate in effect. FRB officials said that the increase was aimed at heading off inflationary pressures.

There has been no word of protest from the Executive Department. On the contrary the White House, acting on Burns' advice, has ruled against easing of credit terms on home mortgages, which had been requested by the Housing Administrator.

There is every show of unity about the desirability of tight money—even if this means tighter money between now and election day.

A recent survey conducted by "Business Week" shows that businessmen are caught in this tight money squeeze. The survey showed:

- More than half of the businessmen report they are already squeezed to some extent. And over 80% of the banks say they, too, are squeezed.

(*Continued on page* 63)

Niagara Mohawk Pact Sought

. . . by N. Y. Power Authority, which would exchange block of power for use of utility's land, water rights

Niagara Mohawk Power Corp has called a board meeting for Wednesday Sept. 12 to discuss the terms of an agreement proposed by the Power Authority of the State of New York. The Authority is seeking a federal license for development of the power potential at Niagara Falls and is offering certain concessions in return for land and water-use rights now held by Niagara Mohawk.

Earle J. Machold, president, Niagara Mohawk, told Electrical World that no decision had been reached late last week as to the company position on the Power Authority proposals. He anticipated no announcement until after the board meeting.

At a recent meeting the Authority offered Niagara Mohawk Power Corp a share of the power output from the development in return for use of the company's land and water-use rights near the site of the proposed state project. Details of the proposed concessions were not publicly disclosed.

The Authority has included in its application to Federal Power Commission a provision to make use of 20,000 cfs now licensed to Niagara Mohawk for its Schoellkopf plant. This plant was severely damaged by a rock slide in June (EW, June 18, p 6) and has been inoperative since. The company has recently announced plans for rehabilitating one of the three sections of the plant.

Opposition to the Authority's plan has come mainly from Niagara Mohawk and four other utilities in the state which have vigorously fought for free enterprise development of the Niagara waters. The free enterprise fight has gained numerous adherents, but thus far they have acted mainly in support of the five-company plan.

"Make No Commitment . . ."

One such group, "The Committee Against Socialized Power in New York State," has urged that Niagara Mohawk reject the Power Authority proposals. In a telegram to Niagara Mohawk President Earle Machold, the group said, "We urge that you make no commitment which will weaken private rights throughout the state and be construed as yielding to a bitter foe whom at this point you have finally beaten."

The Investors League was even more adamant. It wired Machold: "The investors of America have been supporting your just cause for years and they deeply resent being sold out at this late date to forces of evil."

The Niagara controversey arises from a treaty negotiated with Canada in 1950 which makes available additional power potential from the Falls. In ratifying the treaty, the U. S. Senate reserved for Congress the right to designate the entity which would carry out the development. Senate approved legislation which would permit N. Y. Power Authority to build and operate the project. But the bill died in a House Committee.

Co-op Fights Utility Rural Line

Southwestern G&E protests when Arkansas PSC halts construction of power line into territory served by Ozarks Cooperative; 1955 State law is at bottom of the fight

A private utility and an Arkansas co-op are now engaged in a heated dispute over the interpretation of a new state law. The hassle is about the construction of electric lines and service to customers.

The State Public Service Commission is in the picture too. It has ordered Southwestern Gas & Electric Co to halt construction of a so-called "spite line" into territory serviced by the Ozarks Rural Electric Cooperative Corp.

Until recently, all was peaceful at Springdale, Ark., (pop 5,835): The utility has served the city and the co-op has served the adjoining rural areas. Then an outlying rural area was annexed a few months ago to the City of Springdale. And that's when the conflict began.

At the bottom of the fight is a 1955 Arkansas law. It provides that co-op customers living in an area annexed to a city served by a private company must be turned over to the private utility. The utility must pay the co-op for the facilities or turn over an equal number of customers to the co-op.

New Lines Start Controversy

But when this rural area was annexed to Springdale, Southwestern G&E began building new lines into the area. The company said that the lines were needed to provide service to two customers who had not had service before and had requested it from SG&E.

Officials of the co-op charged that SG&E was building a "spite line." They declared that the utility had refused to abide by the 1955 Arkansas law governing the transfer of facilities in rural areas annexed to cities.

On the other hand, the utility contended that the Ozarks Cooperative had raised its own line where the SG&E line had to cross it. This move forced the utility to build five-foot extensions on its poles to clear the co-op's obstruction.

At this point the PSC stepped into the controversy. It directed Southwestern G&E to stop construction of the "spite line." The commission also restrained the utility from serving any more customers in the disputed area until a hearing was held.

But the utility countered with a request that the PSC withdraw its restraining order. SG&E charged that the order had been issued solely on unverified pleadings of the co-op and without notice of a hearing.

In asking the commission to dissolve its order, Southwestern G&E made these four other protests:

- The PSC did not require any bond to be filed to protect SG&E from damages it would suffer as a result of the order.
- The PSC order had the effect of directing the co-op to continue serving customers in an area prohibited to it by state law.
- The order was contrary to the 1955 state law because the order required the co-op to serve customers within the city limits.
- To require the Ozark Cooperative to serve new customers was an attempt to raise the cost SG&E would eventually have to pay the co-op.

Southwestern G&E is now waiting for the PSC to act on the request that it withdraw its order.

The outcome of the dispute is in doubt. But, regardless of the final decision, the case should result in some clarification of the 1955 Arkansas law governing the transfer of power facilities in rural areas annexed to cities.

AP&L's 'Ham' Moses Retires

Famed utility executive, 'Arkansas Plan' leader, and private power proponent plans return to law practice

C. Hamilton Moses, chairman of the board of Arkansas Power & Light Co for the past five years and famed leader of the "Arkansas Plan" to foster industrialization in the state, has retired to return to his law practice.

Moses, a long-time battler for private power against federal "encroachment", is succeeded as board chairman by Pres R. E. Ritchie (p 36). Moses remains a board member.

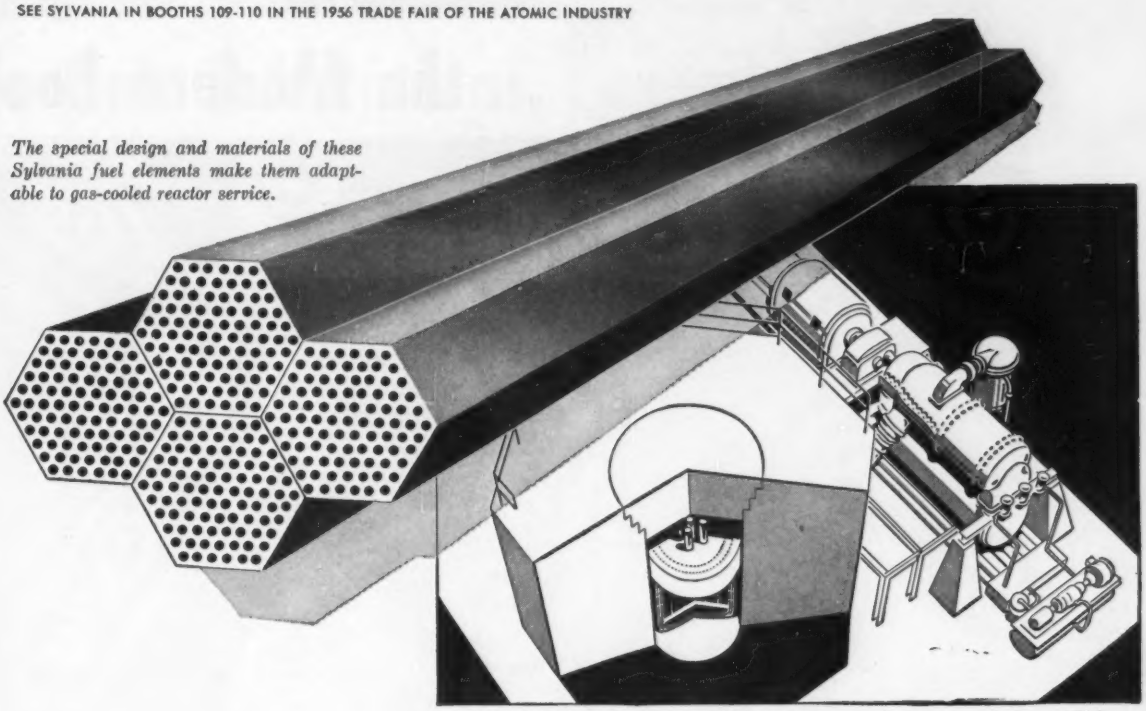
As utility executive and as president of the Arkansas Economic Council-State Chamber of Commerce, Moses led a vigorous 10-year campaign to further the state's postwar growth, through encouragement of new and expanded industries, increased employment, a higher standard of living, and improved conditions for farmers. His program of "Operation Bootstrap", widely known as the Arkansas Plan, brought him recognition in Reader's Digest, Fortune, Time, Colliers, The American, and Business Week, and led to his election as "Man of the South" in 1948.

Before joining AP&L 15 years ago as president, Moses was associated with the law firm of House, Moses, and Holmes. He will now rejoin that firm, with which he has maintained an uninterrupted connection.

A graduate of Tulane University and Arkansas Law School, Moses was admitted to the bar in 1913, and from then until 1919 served as secretary to three governors. He was named assistant attorney general from 1915 to 1917, and became Corporation Commission attorney in 1919. His long association as general counsel of AP&L began in 1919, about the time he co-authored Crawford and Moses' Digest of Laws of Arkansas.

SEE SYLVANIA IN BOOTHS 109-110 IN THE 1956 TRADE FAIR OF THE ATOMIC INDUSTRY

The special design and materials of these Sylvania fuel elements make them adaptable to gas-cooled reactor service.



A typical closed cycle gas-cooled reactor power plant system design, utilizing a gas turbine translation unit. Drawing courtesy of American Turbine Corporation and Ford Instrument Company.

Gas-cooled reactors and high heat

...a problem in fuel element design

THE development of nuclear-powered gas turbines promises to open up important new fields of practical application for atomic energy. If postulated economies are realized, the gas turbine will prove to be an ideal mobile power source for oil tankers and other seagoing vessels. The gas turbine promises, also, to be an economical power source for small generating plants in the 5000 to 50,000 KW range.

To realize inherent economies, the gas turbine requires a gas-cooled nuclear reactor—a type that of necessity operates at high temperature. Fuel elements of customary design are unsatisfactory for this service because of the high operating temperatures encountered. To meet this problem, Sylvania has developed a series of special high-temperature elements that can be adapted to gas-cooled reactor service which calls for fuel operating temperatures of 1200 F and above. In metallurgy, and construction, these Sylvania high-temperature fuel elements are designed to withstand operating temperatures of up to 6,000 F.

If you would like to investigate the practicability of gas-cooled reactors for your own applications ... *remember that the key to economical operation is the fuel element and fuel reprocessing.* Our technical and scientific staff will gladly answer any questions you may have in this area. Write for your copy of: *Sylvania Atomic Fuels and Reactor Components.*

SYLVANIA ELECTRIC PRODUCTS INC.
Atomic Energy Division, P. O. Box 59
Dept. J28V, Bayside, New York

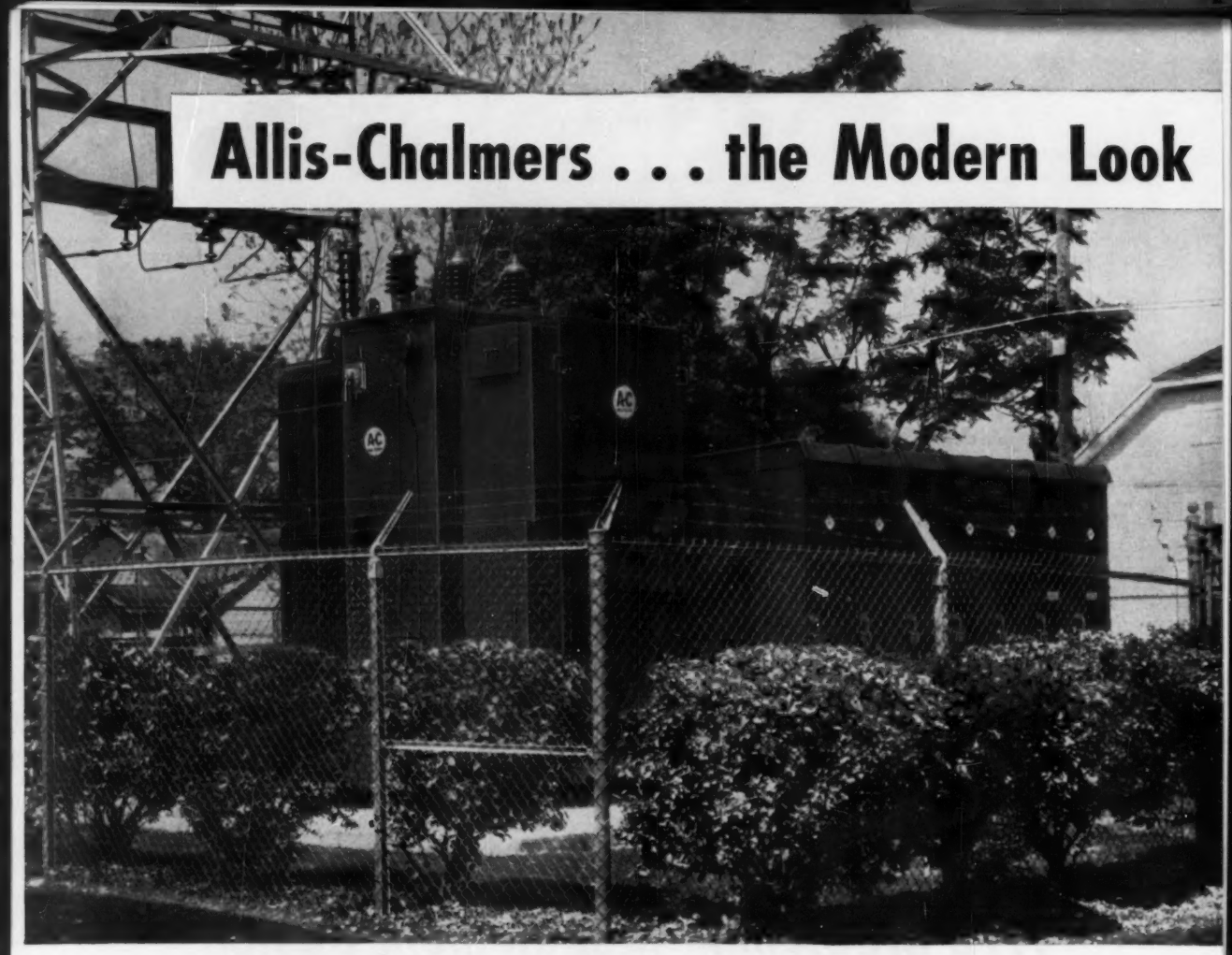
In Canada:
Sylvania Electric (Canada) Ltd.
University Tower Building, Montreal

Sylvania International Corporation
14 Bahnhofstrasse, Coire, Switzerland

SYLVANIA

ATOMIC ENERGY DIVISION

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY



Allis-Chalmers . . . the Modern Look

Allis-Chalmers unit-subs offer a 3-way

Safety - Convenience

Safety—
Further improve your high safety standards with such features as:

- Mounting of potential and control transformers on drawout carriages for complete isolation of primary and secondary contacts during inspection.
- Automatic, positive-acting shutters to isolate high voltage contacts when breaker is withdrawn . . . *not dependent on springs or gravity.*
- Complete steel barrier compartmentation, flame retardent insulation, and safety interlocks.

Convenience—
Here's a typical convenience extra found in all types of Allis-Chalmers switchgear. You can move breaker to test, or even fully disconnected position inside cubicle . . . *and still close the door.* No special storage space is required for breakers not in use . . . handling is reduced.

ALLIS-

answer to your system growth problems

- Versatility

Versatility—

You can build *today* with an eye to the *future* with Allis-Chalmers standardized construction:

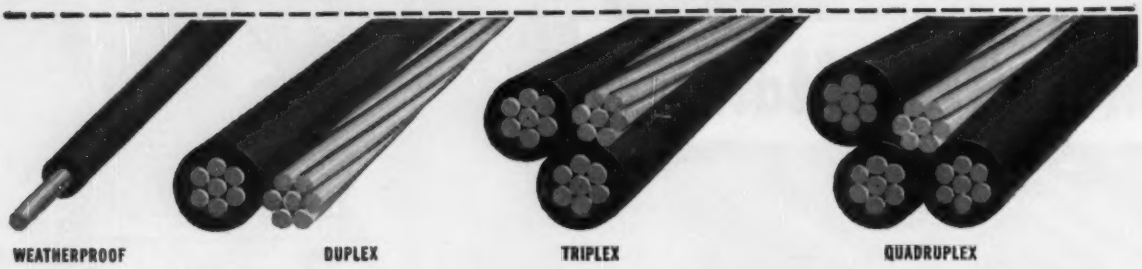
- Additional circuits may be added easily due to grouped control wiring . . . dry bus joint . . . jig-built construction.
- Transformers of larger capacity may be substituted without changing throats.
- Current transformers with higher ratios can be substituted. All have same mounting dimensions.
- Major components are interchangeable.

In addition, there's ease of installation, and extra reliability built into Allis-Chalmers switchgear. For the answer to your system growth problems, call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

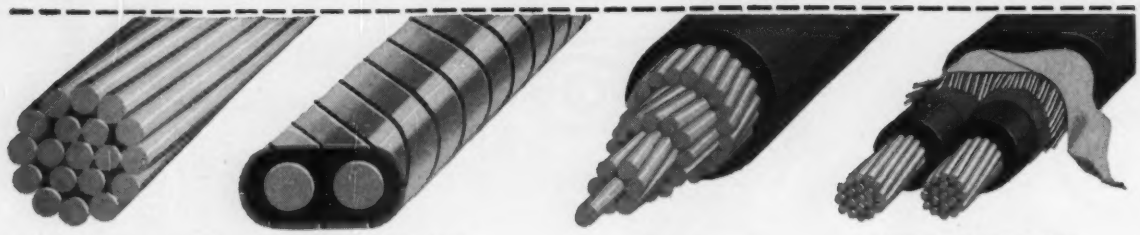
CHALMERS

A-C ALLIS-CHALMERS

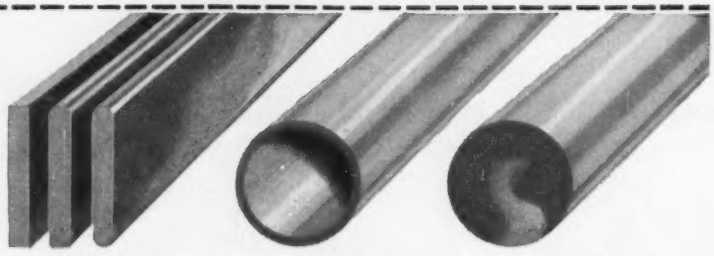
A-5147



WEATHERPROOF DUPLEX TRIPLEX QUADRUPLEX



ASCR • ALL-ALUMINUM • AAAC ARMORED SERVICE DROP BUILDING WIRE SERVICE ENTRANCE CABLE



BUS CONDUCTOR: RECTANGULAR TUBULAR SOLID

Yes,

your K/W distributor carries it!

YOUR K/W DISTRIBUTOR carries a *wide range* of the K/W products shown here. So why not take full advantage of this convenient local source of supply? Make it a habit to call your K/W distributor *first.* (Refer to the list shown and see your local telephone directory.)

Kaiser Aluminum & Chemical Sales, Inc., *Executive Office,* Kaiser Bldg., Oakland 12, California; *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois.

See "THE KAISER ALUMINUM HOUR" Alternate Tuesdays, NBC Network. Consult your local TV listing.

K/W KAISER WIRE — FOR GOOD DISTRIBUTOR SERVICE

Kaiser Aluminum

Aluminum is the answer to Adequate Wiring

KAISER ALUMINUM DISTRIBUTORS
CONVENIENTLY LOCATED TO SERVE YOU:

Alhander Hardware Company
Russell Belden Electric Co.
Brown-Roberts Electric Co.
Capital Electric Supply
Central Electric Supply Co., Inc.
Champion, Inc.
City Electric Distributors
Corpus Christi Hardware Co., Inc.
Crescent Electric Supply Co.
Dauphin Electrical Supplies Co., Inc.
W. E. Duncan Co.
Dutton-Lainson Co.
Electrical & Mechanical Supply Corp.
Electrical Wholesalers, Inc.
Eoff Electric Co.
Evans Electrical Supply Co.
Fairmont Supply Co.
Florida Electric Supply, Inc.
Gem City Electric Co.
General Electric Supply Co.
Glacier State Electric Supply Co.
Hampden Electric Supply Co.
Heider Electric Supply
H. E. P. Supply Co.
Hunsicker Brothers
Interstate Electric Co.
Stuart C. Irby Co.
Line Material Co.
Mack Electric Supply Co.
Maydell & Hartzell, Inc.
National Mill Supply Co.
Nelson Electric Supply Co.
Ozark Electric Supply Co.
S. M. Supply Company
S. M. Electric Supply Co., Inc.
Southern Minnesota Supply Co.
Stubbs Electric Co.
Temple, Inc.
United Electric Supply Co.
Vermont Hardware Co., Inc.
Virginia Electric, Inc.
Weaks Supply Co.
George H. Wahn Co.
Waltrip Electric Co.
Westinghouse Electric Supply Co.

Pres J. W. McAfee (r) tells Ted Mack the requirements of new ad program:

"Impact—so great that it will stand out from the great mass of advertising now directed toward the consumer . . .

Union Electric Launches 'Impact' Ad Campaign

. . . Emotion—so it will create a real desire in the consumer's mind for all of the benefits of electrical living . . .

. . . Frequency—so the consumer will not forget and so new customers will be exposed to our story."

Union Electric Co is preparing to launch a new "impact" type of advertising campaign. President J. W. McAfee says this program will consist of three phases:

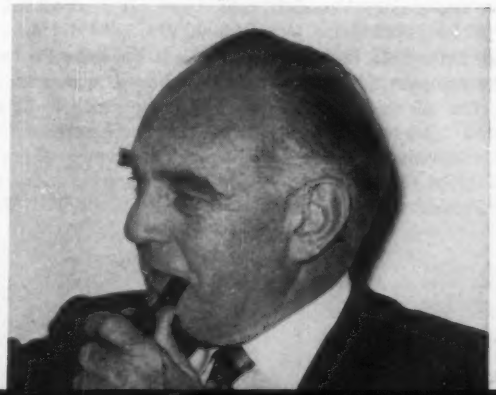
- A monthly one-hour mid-evening television show titled "On Stage in St. Louis." It will feature nationally recognized entertainers and Ted Mack as master of ceremonies, as well as local St. Louis area talent.
- A series of special newspaper advertisements—four this fall and eight in 1957. Each will consist of a three-page section, the first page in full color.
- Billboard ads plugging modern electrical living.

The over-all program will combine Union Electric's institutional and residential sales campaigns into one "impact" program designed to sell company goodwill and the idea of better electrical living. The first phase of the program this fall will fit within UE's 1956 budget.

The new campaign emerges from a decision to concentrate the advertising dollars rather than to split them into several parallel campaigns. This decision results in what Union Electric believes is a new approach to the job of selling electricity and electrical appliances. Throughout the campaign the company will popularize the slogan, "Live today in the world of tomorrow . . . electrically."

The Live Better Electrically theme is strongly supported also in Union Electric's program, and Housepower is covered by full-page copy to run in between the three-page newspaper ads and by smaller ads in real estate sections of the metropolitan dailies.

As Union Electric was shaping up this advertising pro-



gram, the company realized that it could not afford to overlook the sales impact of television. The utility decided that it wanted a program that would use the inherent advantages of the television medium to expand the electrical appliance market.

To get impact in television, the company says, it must come up with something bigger, better, and different. So it is going to stage a type of program that has never been seen before on television in the St. Louis broadcasting area.

Ted Mack to Emcee One-Hour TV Show

Union Electric will present a one-hour television show with Ted Mack as master of ceremonies. The program, billed as "On Stage in St. Louis," will seek to capture community interest overtones by featuring professional and amateur talent from the St. Louis area.

Three kinds of entertainment will appear on the show. The first will be a celebrity who once lived in the St. Louis area. Many of these entertainers are now in New York and Hollywood.

Their appearances are considered a guarantee of a quality show and a responsive home audience. But as added insurance well-known local choral groups will appear on the show. A third type of talent will be young hopefuls getting a first chance at public recognition.

President McAfee feels that around these talented nonprofessionals and a guest celebrity the company is producing a local community interest television show with all of the impact of network spectaculars.

The key man of the show, however, is Ted Mack. The company believes that he is one of the best salesmen in the nation and can turn in a sales job that will deliver results.

Ted Mack himself is looking forward enthusiastically to the show. He will deliver two of the four 1½-minute commercials on each program. However, he feels that the entire 60 minutes will be a "continuous subconscious commercial" and "will establish a very personal bond between the viewing audience and the show, the people on it, and the concept of electrical living."

Ted Mack is looking forward to selling electricity for Union Electric. "You don't have to make wild claims," he declares. "All you have to do is tell the folks what you like about it."

The company chose Ted Mack because of his easy-going approach and his popularity that has grown over the many years he has emceed "The Original Amateur Hour" on radio and television. The Union Electric TV show, however, will be in no way connected with the operations of the amateur hour.

The television show will emanate from the 3,600-seat Opera House of Kiel Auditorium over station KSD-TV, an affiliate of the National Broadcasting Co and one of the two major TV outlets in St. Louis. It is scheduled for 8:00 PM, Wednesday, Oct. 17; 8:30 PM, Tuesday, Nov. 20; and 9:00 PM, Thursday, Dec. 13. If the program meets the company's hopes, it will be continued next year.

The television program is expected to reach about one third of the 600,000 TV sets within the broadcast area. About 90% of Union Electric's customers will be within range of the broadcast.

President McAfee is enthusiastic about the Ted Mack television show because of its community aspects and because it is expected to do an impact job of advertising. Union Electric is accomplishing this within its television budget by discontinuing a 30-minute weekly film show for the last 26 weeks of this year. This TV film show had been broadcasted at 9:30 on Saturday nights.

Step into your electric laundry and you're in the "world of tomorrow"—today!
Union Electric reports on revolutionary new electric appliances with "future" features . . . here right now!
Put the "world of tomorrow" in your home now . . .
(see following pages for ideas)

UE's Impact ads: full-color page . . .

Just to help insure the success of the new show, the Ted Mack organization will actively promote the program weeks in advance. The 3,600 audience seats will be given to employees, dealers, customers, and other guests of Union Electric.

Newspaper Ads Go "Spectacular"

Union Electric is running the first of four "spectacular" newspaper advertisements tomorrow, Sept. 11. Each section will consist of three full pages of advertising, the first page in full color and the next two in black and white.

The first special ad will feature the conveniences of the modern home laundry. The October ad will plug the all-electric kitchen. Then it will be lighting in November and small household appliances in December.

The new program replaces the product advertisements originally scheduled for the rest of this year. This enables the company to keep its 1956 budget intact. The new type of promotion is also timed to tie in with Edison

Dramatic new ideas in laundering... clothes care...ready for your home!
As little as $15.00* a month buys almost any one of these "world of tomorrow" electric appliances!
LIVE BETTER... ELECTRICALLY in your "world of tomorrow"—today!

followed by two black-and-white pages plugging better electrical living

Electric Institute's promotional calendar.

This is what the September ad looks like. The first page of a section of the newspaper has a full-color illustration of an all-electric laundry. The ad invites the consumer to "Step into your electric laundry and you're in the 'world of tomorrow'—today!"

On the next two pages of the ad are black-and-white photographs of electric appliances for the home laundry. Then the story is wrapped up with the message: "As little as $15.00 a month buys almost any one of these 'world of tomorrow' electric appliances!"

The company feels that this is a fresh approach that promotes a whole group of appliances and at the same time establishes the concept of electrical living.

Union Electric's advertising is getting strong support from the local electric appliance dealers. They have bought their own advertisements on the pages that follow the three-page section. The newspapers are supplementing the advertising with editorial material from their appliance editors and expect to publish as much as an 8 or 12-page section.

Each of Union Electric's three-page advertising sections will appear in the St. Louis Post-Dispatch and then about two weeks later in the St. Louis Globe-Democrat. Adaptations of the black-and-white ads will run in three outlying daily newspapers and in about 30 regional weeklies throughout the Union Electric service area.

Beginning in September with the publication of the all-electric laundry promotion, these three-page sequences will appear twice a month through December in the two St. Louis daily newspapers.

Billboard Ads Round Out Campaign

Union Electric will carry this same general theme of advertising into its billboard ads.

This is the way it will be done. On the entire left side of a billboard will be mounted a photographic reproduction of the new electronic oven that bakes a potato in four minutes. On the right side will be printed the theme for this fall: "The world of tomorrow is here today."

The company will try to make the billboards a news-type of bulletin board by changing the picture on the left side of the board to feature other new electric developments. Other billboard illustrations will feature the pull down range and new table top appliances. These will all be produced at once and rotated monthly into different parts of the service area.

Union Electric worked out this new advertising campaign with the help of the Gardner Advertising Co of St. Louis and New York.

Moon-Struck Engineers

The moon strikes French engineers as a potential power source, and although Americans may look askance at a French proposal to harness the moon-driven tides of the Rance River at St. Malo, the French still think the idea is good.

They figure to be getting 800 million kwhr out of a proposed $90-million dam there by 1963, and that seven of the dam's 38 turbogenerators will be working by 1961. In France, where it costs 1.1¢ to produce 1 kwhr with coal, this sounds good. But special two-way turbines must be designed to harness the ebb and flow of the tide.

Gallatin to Start This Month

TVA's first generator at Gallatin steam plant is now expected on the line late this month. Original schedule was disrupted when the $1.5-million stator of the innercooled 250-Mw No. 1 generator failed in a test run Aug. 1 (EW, Aug. 20, p 101). Power production will be with No. 2 generator mounted on the damaged unit's foundation. The second unit was shipped assembled to TVA late last month on a 32-wheel drop-center railroad car.

TVA engineers could not explain the stator failure. They said repair costs, estimated as high as $500,000, are the manufacturer's responsibility.

Westinghouse spokesmen said they would be unable to account for the failure until the damaged machine can be disassembled and inspected at the company's East Pittsburgh plant.

Pacific P&L Starts Coal Hunt

It will be at least six months before Pacific Power & Light Co can officially begin investigation of its hydroelectric-coal plant that has been proposed for the south fork of the Coquille River (EW, Sept. 3, p 78). State law requires Oregon Hydroelectric Commission to wait this period before issuing an investigation permit. However PP&L already has received its coal prospecting permit and core drilling can get under way immediately. Equipment already has been dispatched to Eden Ridge which is believed to contain as much as 50 million tons.

Rate Change for House Heat

Pacific Power & Light Co has asked Oregon Public Utilities Commission for approval of a proposed elimination of demand charges from single-phase residential service in areas of the state where such charges are now imposed. PP&L estimates the saving will be $37,000 annually to customers presently required to meet the demand aspect for space-heating service. The corrected rate schedule would make uniform throughout the state PP&L's present Portland area program for such service.

"TVA Is Stronger . . ."

Tennessee Valley Authority Chairman Herbert D. Vogel says TVA has prospered and gained strength in his two years as chairman—despite what he called "scare propaganda" by "the prophets of doom."

In a policy speech, he said part of the propaganda has been based on the fact that TVA appropriations were cut from $120 million in fiscal 1955 to $27 million in fiscal 1956, to $5 million in 1957.

"These figures do not include appropriations carried over from previous years," Vogel said. "But they are, nevertheless, representative of a reduced drain on the federal treasury. The balance required to do the job has been provided by corporate earnings which have increased each succeeding year."

Niagara Plans 2 Steam Units

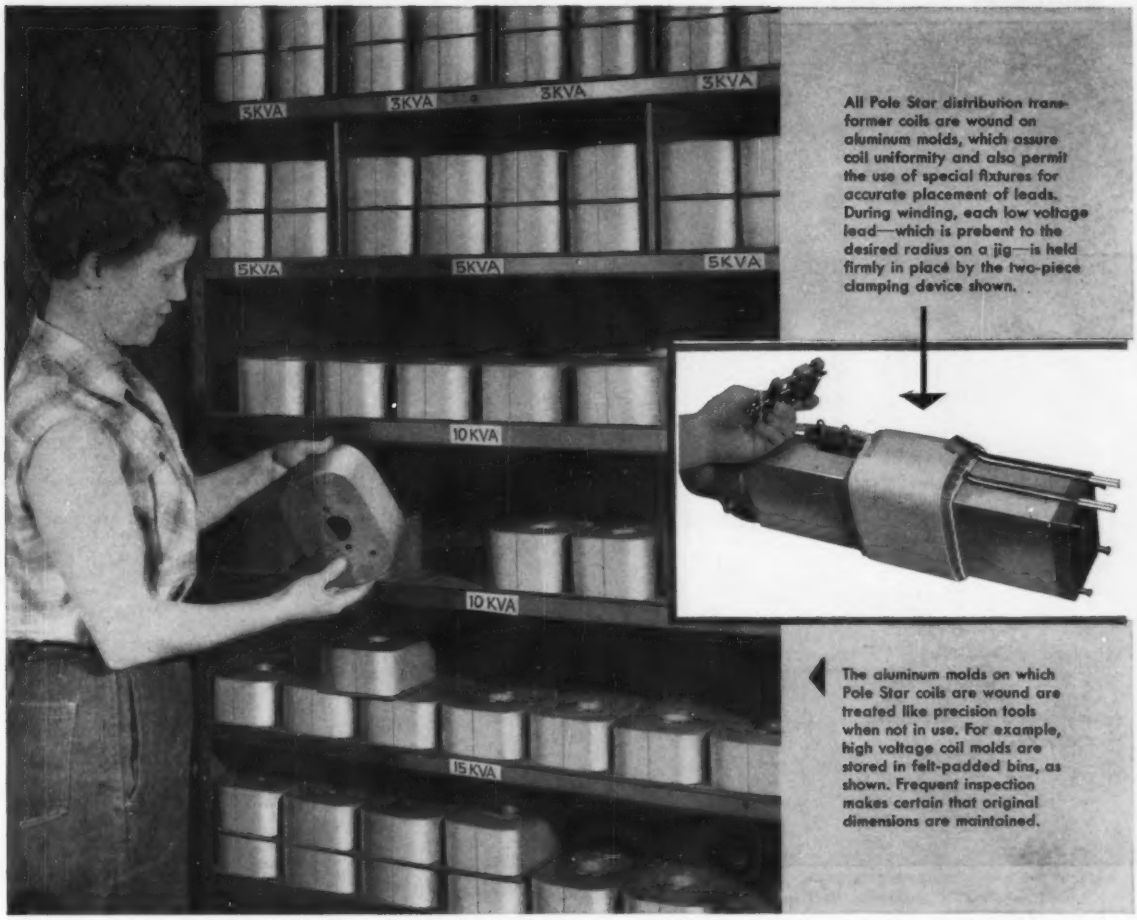
Niagara Mohawk Power Corp is planning to add two 200-Mw steam-electric generating units to its system by 1959 to raise steam-electric capacity to 2.6 million kw, and total system capacity to 3.5 million kw. In combination with related transmission facilities, the new power plant will cost about $75 million, and will be situated in western New York State.

In making the announcement, Pres Earle J. Machold pointed out that these new units will be needed "even when all hydro-power available at Niagara Falls is fully developed." He observed that the continuing growth in use of electricity in the area will require far more generating capacity than is latent in remaining water sources.

Since 1946, the company has built new steam plants at Dunkirk, Buffalo, Oswego, and Albany; a hydroplant on the Sacandaga River; and is completing five new hydroplants on the Raquette River. In this postwar period, the company has spent more than $500 million in anticipation of the demands of its customers.

The Breeze Is Extra . . .

Bad weather has thrown Public Service Co of Indiana behind schedule in the erection of its new power plant opposite West Louisville on the Ohio River. To catch the $140-million, 900-Mw project back up to schedule, pile-drivers have been working past bedtime. One woman said she solved the sleep problem by letting her electric fans run all night. Her fans drown out the pile-drivers.



All Pole Star distribution transformer coils are wound on aluminum molds, which assure coil uniformity and also permit the use of special fixtures for accurate placement of leads. During winding, each low voltage lead—which is prebent to the desired radius on a jig—is held firmly in place by the two-piece clamping device shown.

The aluminum molds on which Pole Star coils are wound are treated like precision tools when not in use. For example, high voltage coil molds are stored in felt-padded bins, as shown. Frequent inspection makes certain that original dimensions are maintained.

She goes to a felt-padded cupboard to fetch your POLE STAR® coil a mold

Accurate dimensions — particularly in the core-and-coil assembly—contribute much to the dependability and efficiency of Pole Star distribution transformers. For that reason, coils are wound on precise, aluminum molds, which are given "kid-glove" treatment when not in use. Molds are moved directly from the pictured storage bin to the winding machine and vice versa, with no in-between reposal on tables or floor. Frequent inspection of all molds makes certain that the original precision is maintained.

With aluminum molds, end turns are tied in with spring clips; there is no marring of the mold surface such as when nails are used for this purpose with ordinary wooden molds. A further advantage is that aluminum is not subject to "aging," whereas wooden molds often dry up and crack or shrink, with consequent changes in dimensions.

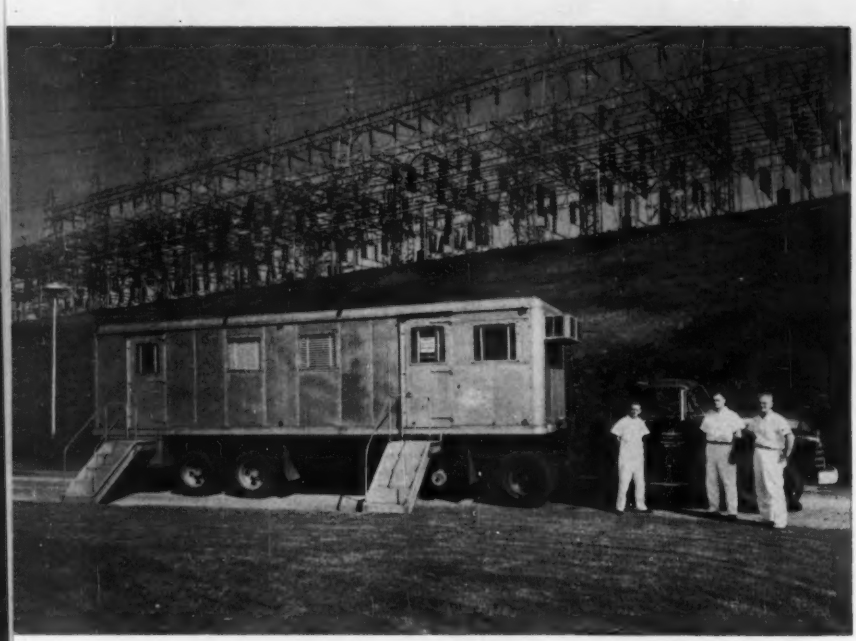
Such concern with accuracy is typical of Pole Star production methods. It means outstanding quality and dependability . . . everytime.

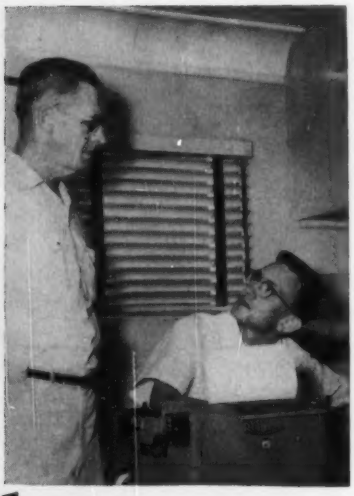
167 Production Controls make Pole Star Best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.





1 **HEALTH HISTORY is asked of employee by the clerk of TVA's mobile clinic that visits outlying Valley areas**

Mobile Clinic Checks TVA's Health

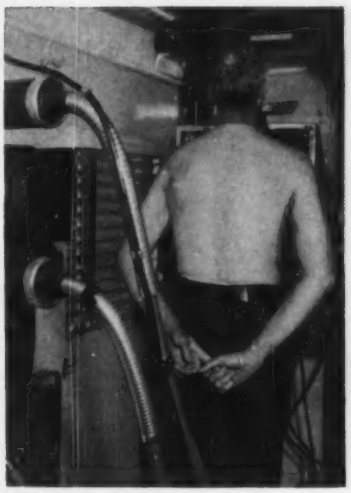
A mobile clinic is now making a regular check on the health of the Tennessee Valley Authority. The dispensary on wheels travels through the outlying areas and calls on about 6,000 employees who cannot conveniently visit TVA's medical centers.

The clinic proved its value in a year's operation on a trial basis and is now part of the TVA industrial medical program. This program is aimed at keeping employees in jobs they can do efficiently and without hazard to themselves or others.

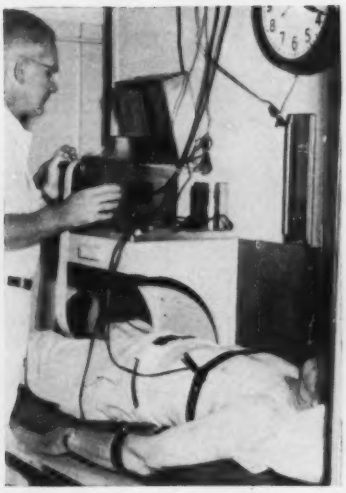
The clinic provides such services as chest X-rays, electrocardiograms, blood pressure measurements, and blood and vision tests. Two medical technicians and a clerk make these various tests and report their results for interpretation by a TVA physician. He notifies the employee of the findings and tells him if any follow-up work is necessary. Conditions having direct bearing on the employee's ability to work safely are then studied in greater detail.

TVA finds that the rolling clinic is a useful tool for helping its physicians maintain an up-to-date assessment of an employee's health and its relation to his job. With the employee's consent, evidence of abnormalities is made available to his private doctor who is asked to keep TVA physicians informed of future findings and treatment. This exchange of information enables the TVA health service to sell employees the idea that they should correct abnormal conditions in order to prevent disability.

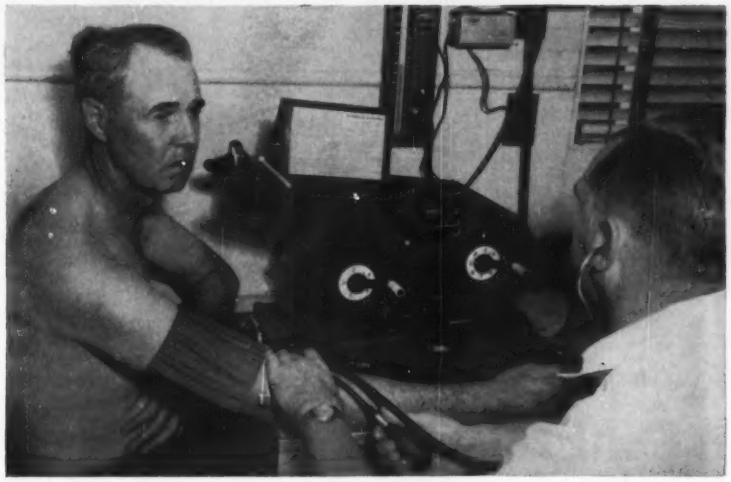
2 HEIGHT-WEIGHT measurements are taken by one of the two medical technicians that staff the health clinic



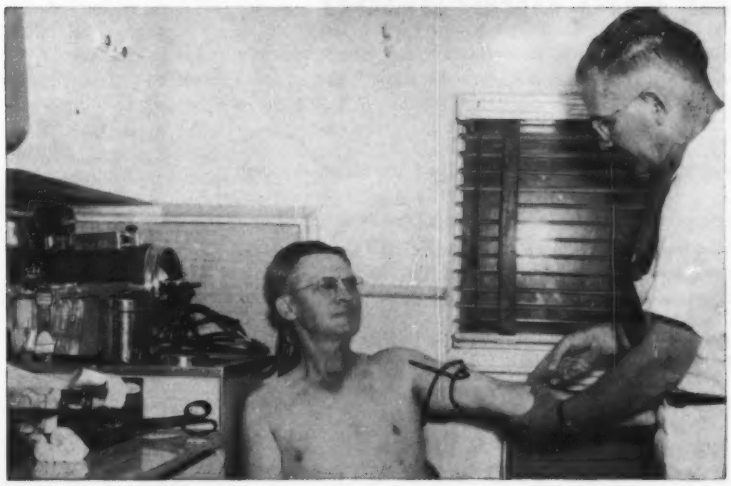
3 CHEST X-RAY is taken. It will be studied by a TVA physician who then notifies employee of the findings



4 ELECTROCARDIOGRAM is made for one of the approximately 6,000 employees that are examined by the clinic

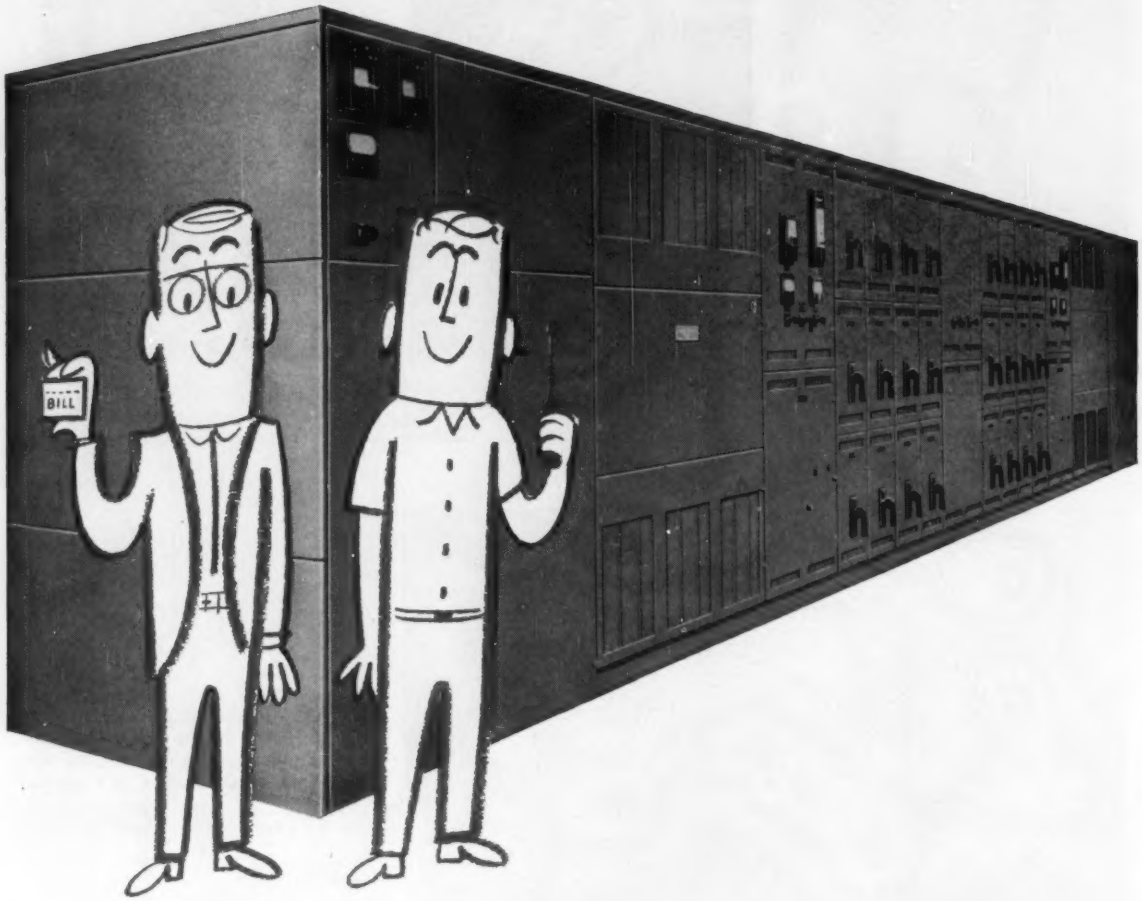


5 BLOOD PRESSURE is checked. If it is abnormal, results will be handed over, on employee's consent, to his private doctor who keeps TVA posted



6 BLOOD SAMPLE is taken as part of this program that is aimed at keeping Authority employees healthy and in jobs they can perform efficiently

I-T-E Secondary Unit Substations



. . . designed and built for economy in installation and operation

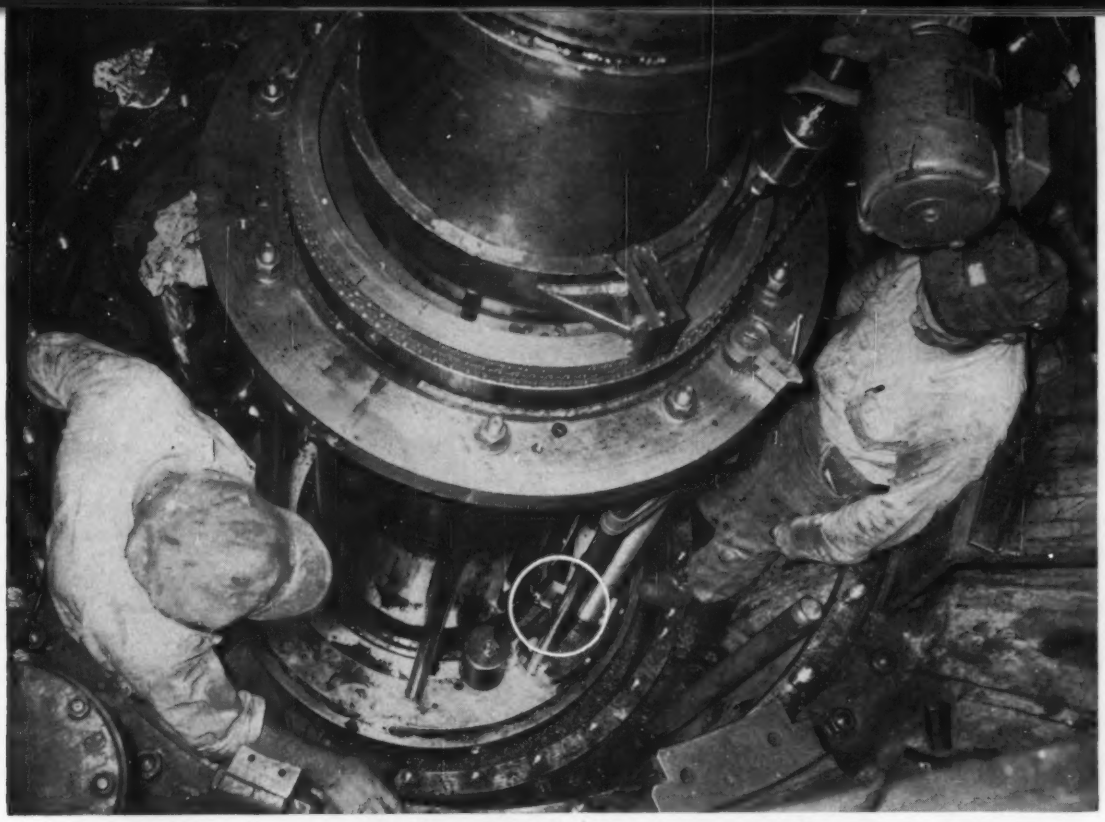
I-T-E Secondary Unit Substations bring electric power nearer to where you use it—make it more dependable—save you time and money.
They do it in several ways:

- By bringing higher voltages nearer the load and reducing power losses
- By reducing voltage drops inherent in long low-voltage runs and increasing machine efficiency
- By saving space—all necessary components are housed in one functionally designed unit
- By cutting delivery and installation time—units are assembled, tested and shipped ready for immediate installation from one source of supply
- By protecting plant personnel—all live parts are isolated and metal enclosed

I-T-E Secondary Unit Substations can be supplied for any application indoor or outdoor, and in any standard rating. For complete information, contact your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

I-T-E

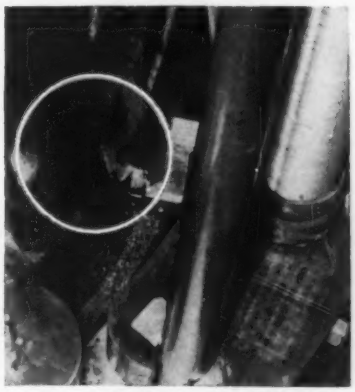
I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division



Without dismantling machine, eccentric shaft was turned down in 4 days by . . .

. . . this carbide tool

How Holyoke WP Fixed Turbine Shaft in 4 Days



Holyoke (Mass.) Water Power Co has corrected satisfactorily an eccentric turbine shaft in about four working days by using a device visualized by its chief operating engineer, Fred Rutka.

Rutka visualized a cage that would fit around and rotate about the stationary shaft. The device subsequently was developed and built with help of B. F. Perkins & Son, a machinery manufacturer at Holyoke.

The repairs were made to a 15,000-kw vertical unit at HWP's Hadley Falls station on the Connecticut River. Despite adjustments made to the lower guide bearing from time to time, the shaft reached a maximum eccentricity of 0.023 in. in a length of 37 in.

The manufacturer could only recommend that the entire unit be dismantled and the shaft shipped to the factory. This would have deprived the utility of the machine's service for possibly three or four months, and the repair cost would have included also the cost of dismantlement.

Rutka's device, which obviated dismantling, consists of a cage-like split assembly built in two 180-deg sections which fit about the turbine's 26.5-in.-diam stainless steel shaft. It carries a ¾-in. standard K-370 carbide-tipped cutter which, when the cage turned counter-clockwise at 20 rpm, had a surface speed of removal of 140 fpm. The cage was driven via three V-belts by a 2-hp, 440-v, 3-phase induction motor.

The whole structure weighed about 1.5 tons, and was lowered into place by the station crane. About two days were required to install and line up the cutting tool. A metal deflector was installed to prevent steel chips from falling upon the lower guide bearing.

Top and bottom of the cage are held apart by five 1¾-in. O.D. steel spacer tie rods 58 in. long. A ratchet (pointing at man's stomach in cut) governs the feed of the cut of steel from the turbine shaft surface. The teeth of the ratchet enable the feed of the cutter to be adjusted between 0.0023 in. and 0.014 in.

Experience indicates the desirability of providing five V-belts should a future machine of this caliber be built, although three worked well.

Final micrometer measurements of the shaft showed that the eccentricity was reduced to a maximum of 0.0015 in.

DISTRIBUTION TRANSFORMERS

THIS CONNECTOR

COULD SAVE YOU...$60

Estimate your possible savings in terms of all transformers on your lines

It's an old story to many utilities—customer complaints about radio or TV interference. And it's an expensive story, too—at an average of $30 a service trip. In fact, it often takes a couple of calls—for a total of $60—before the real villain is revealed. That villain is "cold-flow"—the tendency of aluminum to yield causing loose connections. A little multiplication of the number of transformers on your lines will prove that "cold-flow" can be a costly nuisance.

G-E connectors save you those service trips. G-E connectors counteract "cold-flow" of aluminum conductors, give an extra-tight grip on copper conductors. Low-voltage bushings have two coned-disk stainless steel washers which automatically maintain high pressure. High-voltage, tank-wall bushings achieve the same result with an internal, stainless steel follow-up spring.

Even if you don't use aluminum conductor, you still want assurance of tight connections. The new G-E connectors can save costly service calls.

Look at the other money-saving features offered by G-E distribution transformers: **Impulse testing** saves years of transformer life. **One-piece clamping bands** save maintenance time. Reusable **Nitrile rubber gaskets** help save units from contamination. **Strenicor terminal clamps** save terminals from breaking. **Super Melaglyp paint** saves up to two repaintings. **Nationwide warehouses** save utilities heavy inventory expense. **Service shops** can cut your repair and rebuilding costs.

For the complete story contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to General Electric Company, Section 431-39, Schenectady 5, New York.

dollar-saving features prove ATANA*

***ALL TRANSFORMERS ARE NOT ALIKE**
(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	√			√		√
Nitrile rubber gaskets	√					√
One-piece clamping band	√					
H-v and l-v terminals handle both copper and aluminum conductors	√					
Strenicor pressure terminal clamps	√					
Super Melaglyp paint	√					
More than 100 warehouses	√	√				
Nationwide, company-operated service shops	√	√				

Progress Is Our Most Important Product

GENERAL ELECTRIC

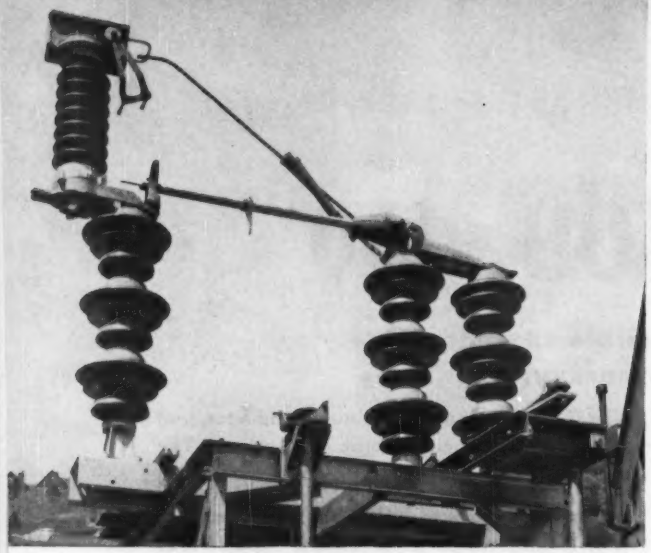
Load-Interrupter Switch Uses SF_6

Simple, low-cost, outdoor device combines functions of a circuit interrupter and a disconnecting switch in effective manner

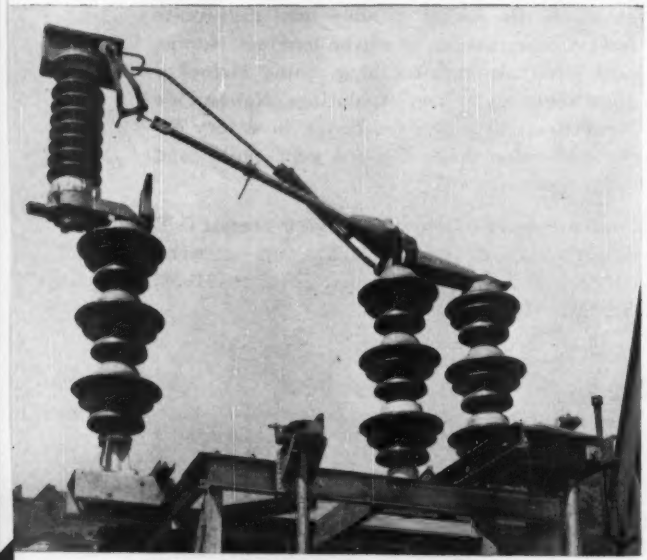
C. W. UPTON, Protective Devices Engineer, Westinghouse Electric Corp, East Pittsburgh, Pa.

G. J. TEWINKLE, Division Engineering Department, Buffalo, N. Y.

L. M. BYRNES, Division Engineering Department, Niagara Mohawk Power Corp, Syracuse, N. Y.

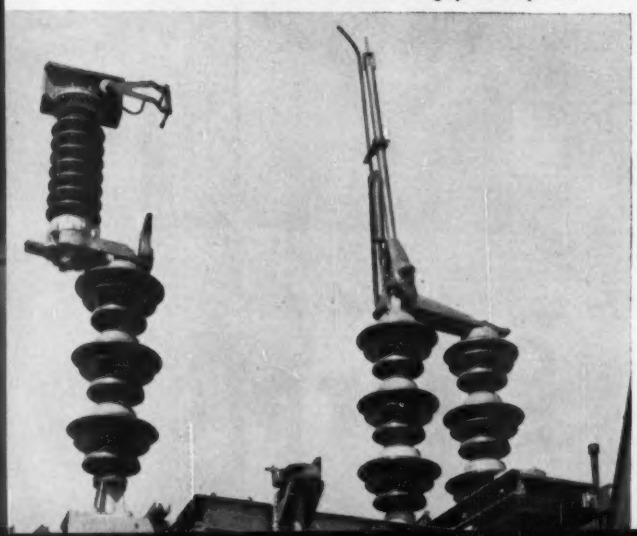


115-KV INTERRUPTER SWITCH is in the closed position. It consists of outdoor air switch plus interrupting device



ROTATION raises blade from the stationary contact and diverts current flow through paralleling interrupter unit

TWO BLADES rise together during final 40-deg rotation of insulator to establish full visible air gap as required



A simple, low-cost, outdoor, load-interrupter switch, combining the functions of a circuit interrupter and disconnecting switch, has been developed by Westinghouse Corp to meet the requirements of Niagara Mohawk Power Corp. After exhaustive laboratory tests, units rated 34.5 and 115 kv were tested on the Niagara Mohawk system, where they operated satisfactorily for all types of switching service. Niagara Mohawk now has a number of permanent installations successfully using this type of switch.

The device effectively interrupts charging currents to lines, magnetizing currents to transformers, and load currents, and provides positive air-gap isolation of lines and equipment for safe inspection and maintenance. It consists of a standard outdoor air switch to which has been added a device for interrupting load currents up to 600 amp.

The basic switch, a modern vertical-break unit, has ice-breaking ability, full continuous and short-time current-carrying capacities, ease of operation, and a minimum maintenance requirement.

Unit Easy to Install

The interrupter is a parallel-connected sulphur hexafluoride-filled unit which carries current only during the interrupting interval. Thus it can be made lightweight and easy to operate without subtracting from the continuous or momentary capacity of the air switch. It is porcelain clad, positively sealed, and needs no external supply of gas or any auxiliary apparatus for operation.

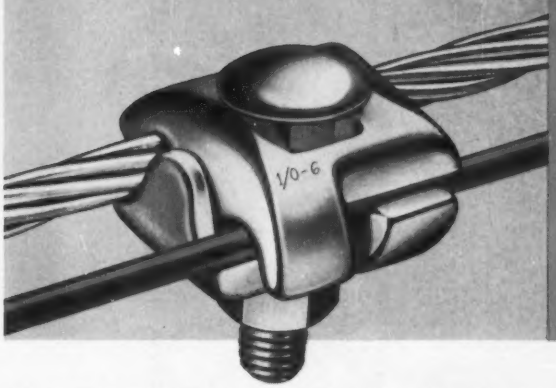
The unit, as a whole, is as easy to install as the conventional air switch.

The 115-kv unit was tested in January 1953 at Niagara Mohawk Power Corp's Seneca terminal station in Buffalo, because of the flexibility of the 115-kv transmission system in and around that city. It was tested for ability to interrupt and close parallel load current, interrupt and

(*Continued on page* 30)

You can standardize on one

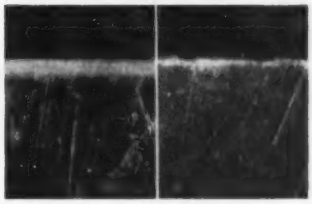
CHANCE AGP*
Parallel Groove Clamp
for all connections...



FORTIFIED CADMIUM... PROVED BEST BY TEST FOR JOINING ALUMINUM AND COPPER CONDUCTORS

"Your AGP connector, cadmium clad as you do it, is going to solve one of our greatest problems of making lasting A and C connections."—Power Company

"Your AGP clamps were subjected to approximately 500 hours in a humid sulphide atmosphere and after cleaning to remove the sulphide coating which had formed on the exterior, they showed no evidence of a breakdown of the fortified cadmium plating."—Eastern Utility



Micro-photograph shows how high-density FORTIFIED cadmium, applied to a thickness of .001" on Chance AGP Clamps, compares with commercial plating at right.

Aluminum to copper, copper to copper, copper to aluminum, or aluminum to aluminum

Connecting copper and aluminum conductor requires a general purpose connector as good as the conductor itself in conductivity, mechanical stability and corrosion resistance, if future trouble on the line is to be avoided.

The best conductor for this purpose is an aluminum bodied clamp with a properly applied coating of high density, fortified cadmium, proved best by every test for long-lasting, trouble-free, general purpose connections.

That's what you get in the Chance AGP Parallel Groove Clamp, companion to the widely tested and accepted Chance AGP Tap Clamp. You can standardize on one AGP clamp for any combination of aluminum or copper in a wide size range. Simplify stocking and eliminate the chance for error in installation.

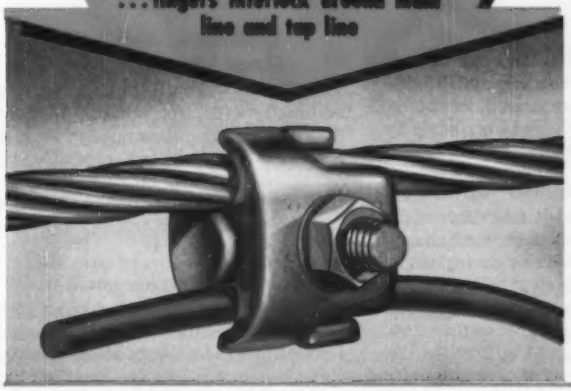
*Aluminum General Purpose ... the All-Purpose Clamp That Needs NO COPPER INSERT

A. B. CHANCE COMPANY, Centralia, Missouri

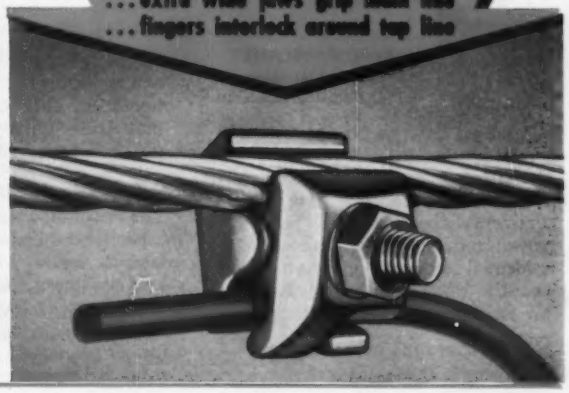
Your choice of two designs

CC56-15

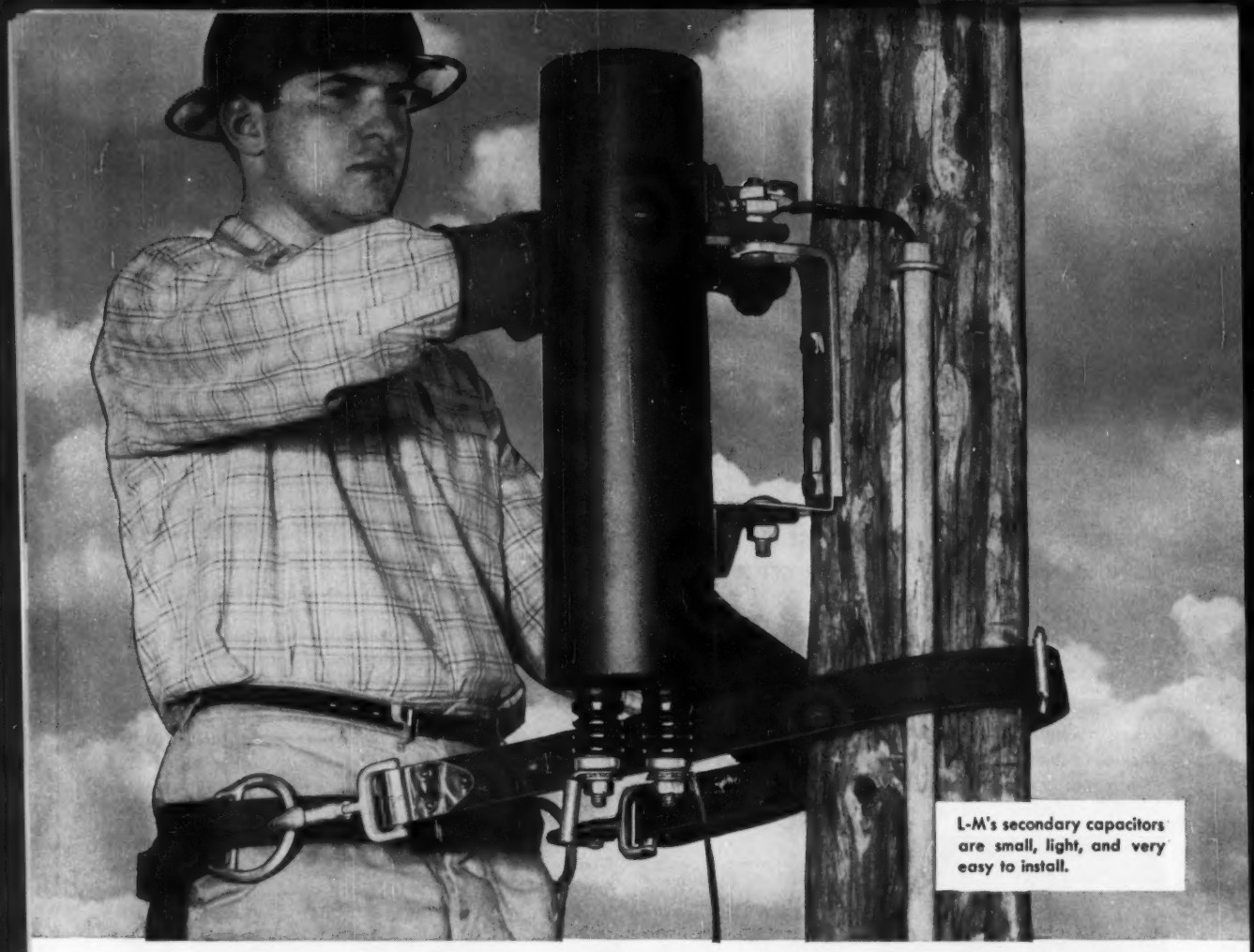
NEW PG 200 SERIES
... fingers interlock around main line and tap line



PG 100 SERIES
... extra wide jaws grip main line
... fingers interlock around tap line



In Aluminum General Purpose or Uncoated Aluminum



L-M's secondary capacitors are small, light, and very easy to install.

L-M Secondary Capacitors Improve Overloaded Distribution System

L-M offers complete line of secondary capacitors as an economical means to increase load capacity, reduce load losses, and improve voltage level of secondary system.

By **N. K. DELANEY**
Product Manager
Capacitors and Regulators
Line Material Company

The effectiveness and economic worth of secondary capacitors have increased considerably because of the heavy load growth from motored appliances. Many residential secondary systems have been forced to operate with loads having as low as 70-percent power factor.

Advantages of Secondary Capacitors

By improving the power factor in the secondary circuit, secondary capacitors can provide the same benefits as obtained by installing larger distribution transformers, heavier secondary conductors, or voltage regulators, and can do this at appreciably less handling and installation costs. This comparison, of course, must be within the range obtainable by power factor correction.

Transformer Capacity Increased

The maximum benefit from secondary capacitors is obtained at the most advantageous period, which is during peak-load conditions. The chart, Fig. 1, shows the decrease in transformer loading obtained by adding capacitors to the transformer secondary, and Fig. 2 shows the recommended number of capacitor units with various transformer ratings.

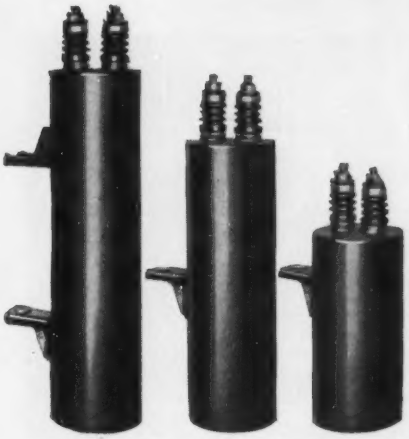
Load-Loss Reduction

The combination of transformer and secondary capacitor is more efficient than a transformer large enough to carry the load. The secondary capacitor, by increasing the power factor of the load, reduces the amount of current that has to flow through the transformer and secondary conductors.

Voltage Improvement

The value of voltage improvement with secondary capacitors is equal to the same amount of fixed primary kvar, *plus* the voltage rise through the distribution transformer and affected secondary.

LM®
LINE MATERIAL
A McGRAW ELECTRIC COMPANY DIVISION



L-M 240 volt secondary pole-mounted capacitors are available in 7½, 5, and 3 kvar ratings. See chart for height and weight.

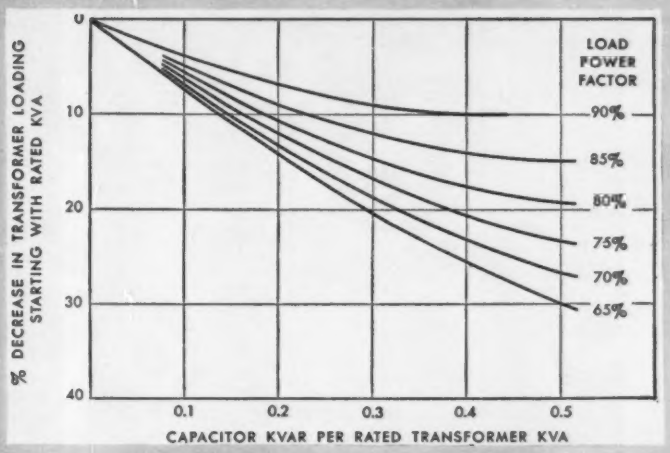
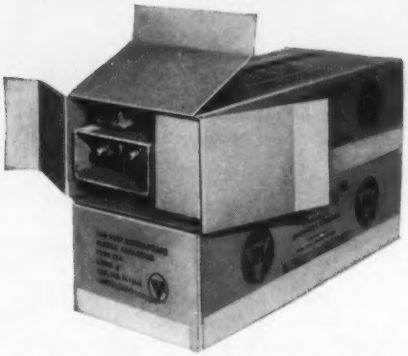


FIG. 1—These curves show how you can decrease transformer loading—at various power factors—by adding secondary capacitors.



L-M's unique carton permits easy testing of capacitors without removing them from the carton.

Distribution Transformer Rating in KVA	Recommended Number of Capacitor Units			
	3 KVAR	5 KVAR	7½ KVAR	10 KVAR
10	1	—	—	—
15	2	1	—	—
25	3	2	1	1
37½	4	3	2	1
50	6	4	2	2
75	9	5	3	3

FIG. 2—The above chart shows the recommended number of secondary capacitor units with various transformer ratings.

Capacitor Location

To obtain the maximum benefit, capacitors should be installed in pairs, located from ⅔ to ¾ the distance to the end of the secondary, in each direction. This recommendation is based on a reasonably uniform load distribution and secondary conductors in two directions from the transformer.

L-M Offers Complete Line Of Capacitor Equipments

L-M's 240V. secondary pole-mounted capacitors are available in 3, 5, and 7½ kvar. 10 kvar's will be available soon.

L-M's 216-volt, 13⅓ kvar submersible capacitors are available in 40, 80, and 120 kvar racks, completely assembled at the factory ready for field installation.

L-M's complete line of primary capacitor equipments includes pole-mounted, single and multi-row racks, factory-assembled blocks and metal-enclosed equipments. Most capacitor equipments are available in 2400- to 13,800-volt; 25 or 50 kvar capacitor units.

Some Outstanding Features Of L-M's Pole-Mounted Secondary Capacitors

Leads of 48-inch, 600-volt, wire furnished as standard equipment.

Bushing-Mounted Fuse with 48-inch lead can be supplied.

Solder-Sealed Bushings of strong one-piece wet-process porcelain provide a positive, lasting seal.

Pole-Mounting Bracket has two 9/16″ holes for ½″ lag screws. Standard EEI-NEMA crossarm-mounting bracket furnished if required. Capacitor can be mounted with bushings up or down.

Aluminum Metallizing process protects steel tank from oxidation; is followed by a chromate primer and a finish coat of alkyd resin paint.

Round-Pack, Round-Tank Design makes these capacitors small, light, easy to install. Unit has a one-minute discharge resistor; is completely impregnated under vacuum with low temperature Elemex liquid dielectric.

Weight and height of L-M's 240-volt, pole-mounted secondary capacitors.

Size Kvar	Height Inches	Net Weight* Pounds
3	13¾	18
5	18⅛	25
7½	23½	33
10	Available Soon	

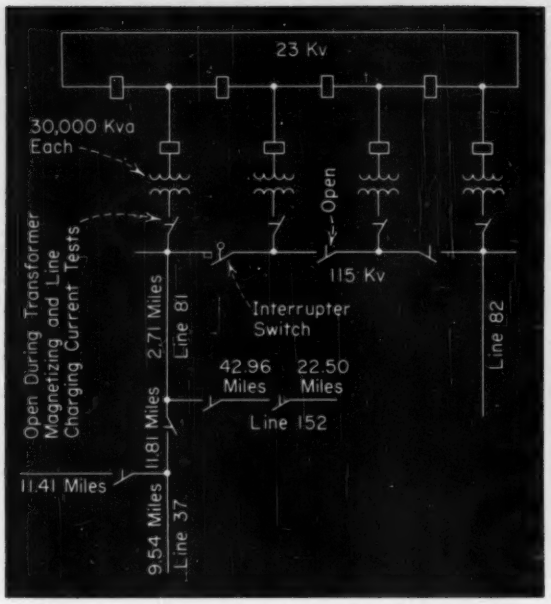
**Weights include the pole-mounted brackets.*

Get The Whole Story On L-M's Capacitor Equipments

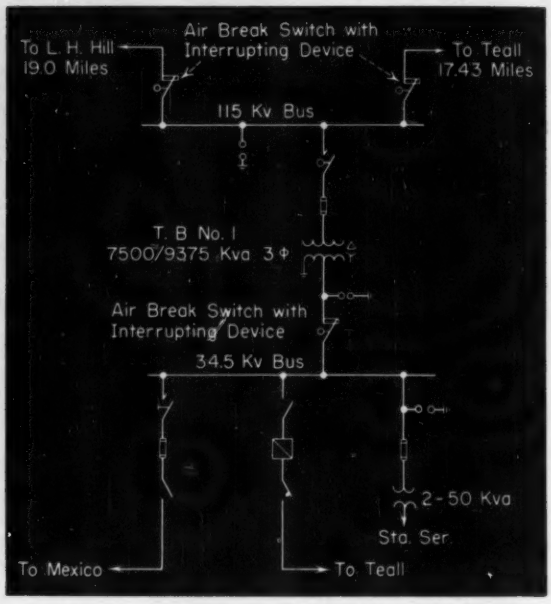
Ask the L-M Field Engineer for complete information and bulletins on the construction and application of L-M's full line of primary and secondary capacitor equipments. Or write Line Material Company, Milwaukee 1, Wisconsin.

257-R 3

Elemex Capacitors



TESTS involved Seneca terminal station elements and parts of the system, Line 82 serving as constant power source


To L. H. Hill 19.0 Miles
Air Break Switch with Interrupting Device
To Teall 17.43 Miles
115 Kv Bus
T. B No. 1 7500/9375 Kva 3 Φ
Air Break Switch with Interrupting Device
34.5 Kv Bus
2-50 Kva Sta. Ser.
To Mexico
To Teall

OIL CIRCUIT BREAKERS, or self-contained load-interrupter switches were required for new Mallory Road station units

Load-Interrupter Switch Uses SF_6 (*Continued from page* 26)

pick up transformer and magnetizing current, and interrupt and pick up line charging current of various magnitudes.

The device interrupted currents on the 115-kv system and picked up corresponding currents as follows:

1. Parallel load current of 40 amp (load side of the switch being energized through the transformer from the 23-kv station bus).
2. Transformer magnetizing current of 3.1 amp.
3. Line-charging currents as follows:

1.0 amp— 2.71 miles of line
9.3 amp—34.06 miles of line
13.5 amp—35.47 miles of line
16.8 amp—45.67 miles of line
24.5 amp—68.17 miles of line.

Service Satisfactory

One 34.5 and two 115-kv load-interrupter switches were then installed at Mallory Road station. As this station was supervisory controlled from Syracuse, 25 miles away, it was necessary to install expensive oil circuit breakers or self-contained load interrupter switches which could break load or charging current without danger of an unconfined arc.

Combinations Studied

Now in operation, the 115-kv load interrupter switches energize and interrupt charging currents on 17.43 and 19 miles of line. The 34.5-kv unit energizes and interrupts transformer magnetizing current of 2.35 amp. Both give satisfactory service.

An oil-filled interrupter, similar in appearance to the final design, was first explored during the developmental stage. But it was abandoned because of the hazard of explosion in the event of an attempt to interrupt above its rating. It was also considered too heavy to be supported on a single insulator stack, the most logical installation for a parallel-type device coordinated with a disconnect switch.

Next, a model was made, using tubular interrupters of the gas evolving dielectric type. These required an unreasonably large contact separation for dependable interruption of high-voltage currents. Mechanical structures providing such contact separation were not only very large but also mechanically impractical. The interrupters needed venting for preventing the building up of gas pressure after repetitive operation. This obviated permanent sealing to protect the gas-evolving material from the weather.

These interrupters, however, exhibited rather limited life, the material being consumed with each operation, and 500 successful operations were obtainable only at very low current values.

Tested in Lab

Discovery of the excellent arc-extinguishing properties of sulphur hexafluoride, SF_6, presented a means for designing a self-contained, gas-filled interrupter. Laboratory tests demonstrated that power currents on high-voltage circuits could be interrupted with very short contact separation in an atmosphere of SF_6. The same held true of small currents.

(*Continued on page* 32)

UTILITIES EXPECT MORE FROM POWERS *American*

Series 350
SERVICE-MAINTENANCE BODY
HANDLES 3 JOBS

Series 450
MAINTENANCE AND CONSTRUCTION BODY
Another unique design, ideal for municipalities!

DUAL PERFORMANCE . . .

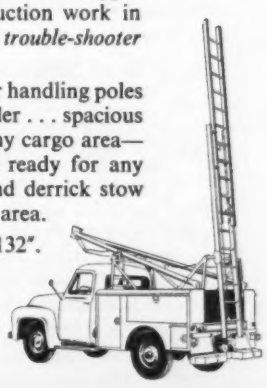
- Revolving aerial ladder for overhead work—revolves 360°—furnished in a height best suited to your needs.
- Underslung winch permits use of derrick—for handling 35′ poles—without interference to aerial ladder.

The Series 450 is available in 108″ and 132″ length.

This extremely versatile body will handle all types of service, maintenance, and construction work in small operations . . . and is an ideal *trouble-shooter* for larger utilites.

An easily-erected fold-over derrick for handling poles up to 35′ . . . a 24′ extension ladder . . . spacious bin-equipped compartments . . . roomy cargo area—all combine to make the Series 350 ready for any job at a moment's notice. Ladder and derrick stow above body . . . never obstruct cargo area.

In four lengths—84″, 90″, 104″, and 132″.



Get complete details and price information. Send for Powers-American Series 350 Bulletin #109R or Series 450 Bulletin #118 *today*.

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY · ST. LOUIS 15, MO. • 625 CEDAR ST. · BERKELEY 10, CALIF.

Load-Interrupter Switch Uses SF_6

(*Continued from page* 30)

In the final design, the main switch contacts as well as the separable contacts in the interrupter are closed when the switch is closed. The normal current path is through the high-pressure jaw contacts and main switch blade which by-passes the interrupter. The center insulator column is rotated to open the switch and interrupter in the following sequence:

How Switch Operates

1. Rotating the driving insulator 30 deg rotates the main blade about its axis to give a contact wiping and powerful ice-breaking action while releasing the pressure of the stationary contact jaws.

2. The second 30-deg rotation raises the blade from the stationary contact, diverting current flow through the paralleling interrupter unit and interrupter isolating blade.

The main switch blade now engages an arm on the interrupter housing which trips an over-center toggle mechanism and causes the contacts within the interrupting chamber to part at high speed. This action interrupts the flow of current with no external display.

3. After tripping the interrupter mechanism, further rise of the main blade continues, and an arm on the blade engages the interrupter isolating blade. The two blades then rise together during the final 40 deg of insulator rotation to establish the full visible air gap required for the air switch.

Closing Reverses Sequence

The closing sequence reverses the opening. The isolating blade is closed, and the interrupter contacts establish a circuit before the main switch contacts close. As the main contacts close, the load is transferred from the interrupter circuit to the paralleling main switch blade.

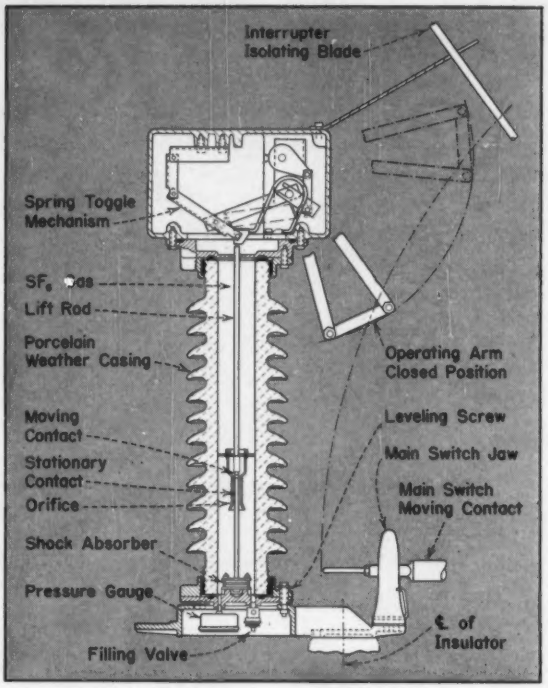
The device consists of a sealed gas-filled chamber containing an axial-flow interrupting unit. The contacts are actuated by a toggle-type spring mechanism to open and close at a speed substantially independent of the operating speed of the main switch. This mechanism is housed on the top of the porcelain casing containing the interrupting unit. A shaft through the housing wall supports the actuating level that is engaged by the main switch blade.

Needs Small Separation

The interrupter contacts operate in an SF_6 atmosphere which exhibits excellent arc-extinguishing properties. Experiments show that only 6 in. of contact separation are needed in SF_6 at atmospheric pressure to interrupt 115-kv circuits.

Accordingly, much smaller and lighter interrupters can be constructed, reduced size and weight being particularly desirable in units to be supported on conventional air switch structures.

Separable butt-type contacts operating in an SF_6 atmosphere have considerable current-interrupting ability at high voltage. This ability can be augmented further by causing un-ionized gas to flow through the arc formed during contact separation.



INTERRUPTER ASSEMBLY, interrelating moving and stable switch elements, is supportable by conventional structure

The moving contact carries a piston and orifice. The piston operates in an insulating cylinder and compresses gas above it as the contacts separate. The arc forms in the teflon orifice as the contacts separate. The upward motion of the piston, orifice, and moving contact creates a flow of gas through the orifice. This simple arrangement brings cool un-ionized gas into close contact with the arc and greatly increases the interrupting ability of the device.

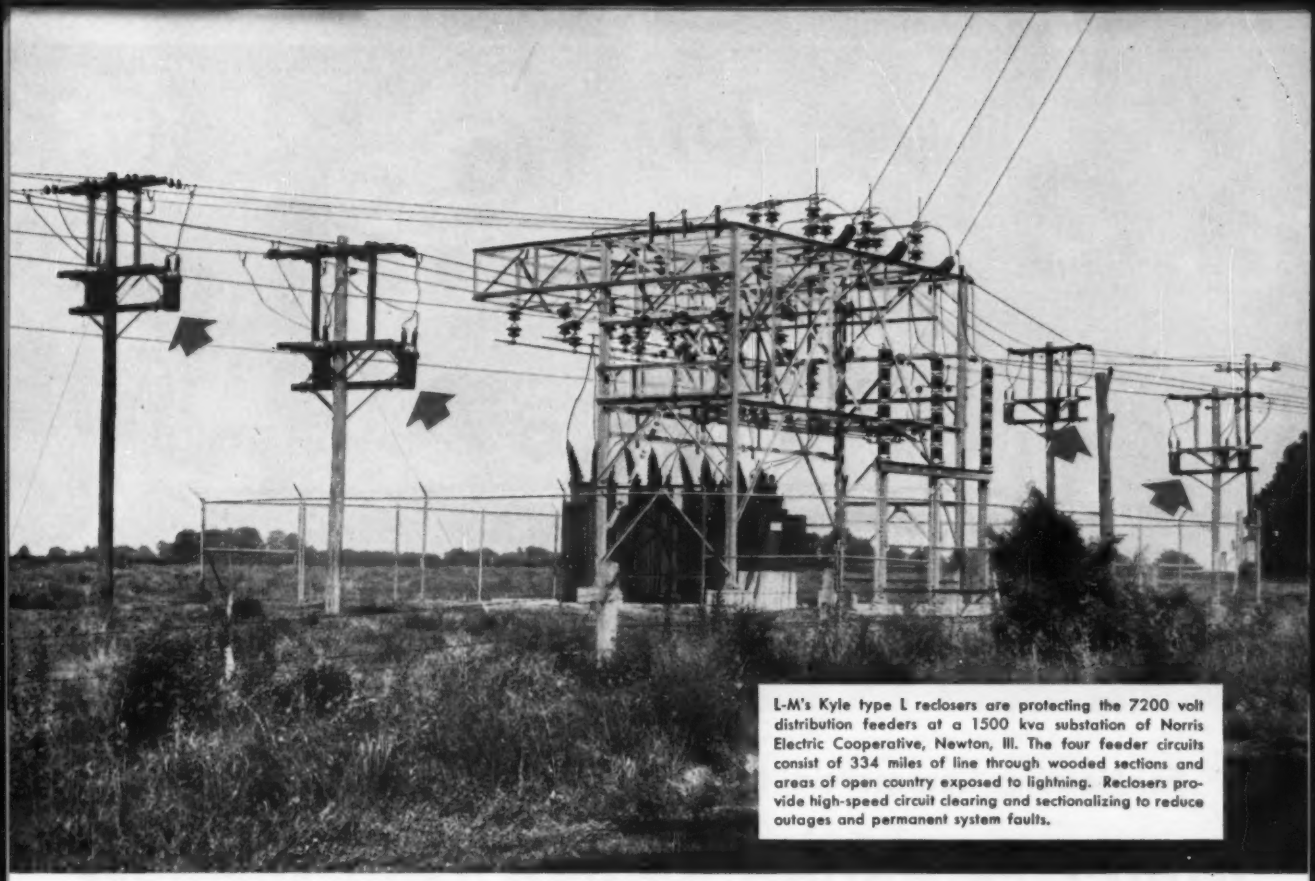
The entire interrupting structure, including the toggle mechanism, is filled with SF_6 gas. A check valve at the top of the insulator is designed to allow free interchange of gas at all times except when the moving contact is approaching the open position.

Gas Not Consumed

All bolted joints are gasketed with silicone rubber, and the rotating shaft assembly is positively sealed while permitting the 60-deg travel necessary to trip the toggle mechanism. A pressure gauge at the bottom of the interrupter is read easily from the ground to check the amount of gas inside.

The unit is filled with gas at 30 psig and interrupts its full rating at 15 psig. The assembly is sealed. Experience indicates that frequent recharging with gas is not necessary.

An additional desirable feature is that the gas is not consumed during arc interruption and withstands rapid successive operations.



L-M's Kyle type L reclosers are protecting the 7200 volt distribution feeders at a 1500 kva substation of Norris Electric Cooperative, Newton, Ill. The four feeder circuits consist of 334 miles of line through wooded sections and areas of open country exposed to lightning. Reclosers provide high-speed circuit clearing and sectionalizing to reduce outages and permanent system faults.

Pole-Mounted Kyle Reclosers Serve As Automatic Disconnecting Device

L-M Kyle reclosers provide high-speed circuit clearing of feeders for transient fault protection and automatic disconnecting of permanent faults with minimum substation investment.

By **JOHN A. SCHWENKE**
Field Engineer
Springfield, Ill., Office
Line Material Company

The relatively high cost of circuit breakers and associated substation equipment has been eliminated at the Dieterich substation of the Norris Electric Cooperative, Newton, Ill. Kyle type L reclosers have been installed on the four 7200 volt distribution circuits to serve as the disconnecting device. These reclosers are completely self-contained and fully automatic.

In addition to segregating permanent faults from the system, L-M's Kyle reclosers provide the high-speed circuit clearing (2-cycles maximum) required to reduce conductor burndown resulting from transient or non-persistent causes.

Reduce Permanent Faults

Transient fault protection is available through coordinated operation of the substation recloser with reclosers and sectionalizing fuses on the feeders. It is possible to clear up to 90 percent of transient faults, reduce permanent faults, and secure these outstanding advantages with L-M reclosers:

- Less serious damage to conductors and equipment.
- Confining of trouble to small area.
- Increase revenue because outages are reduced.
- Greater service continuity.
- Aid in maintaining good public relations.

Kyle reclosers offer the widest choice of time-current characteristic curves and operating sequences. And only L-M offers the fully coordinated series of reclosers and sectionalizers that permits complete automatic protection.

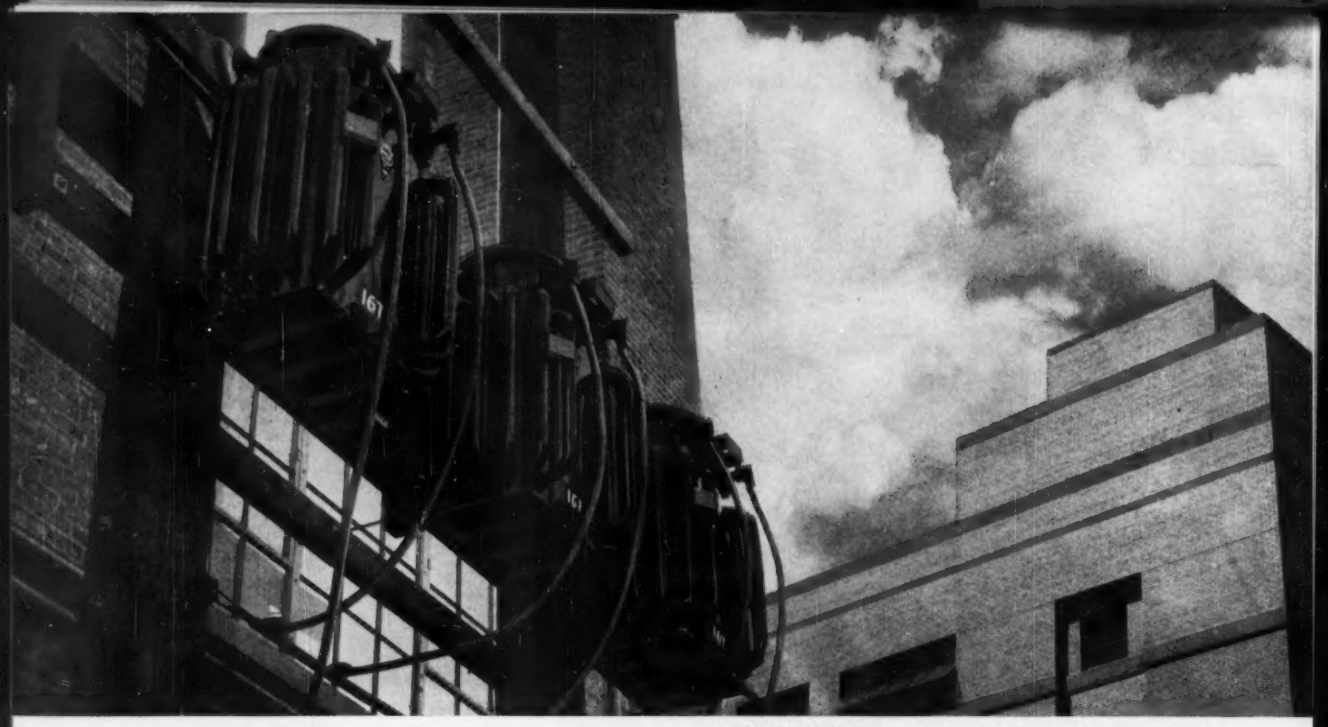
Get the Whole Story on L-M's Kyle Reclosers and Sectionalizers

Ask your L-M Field Engineer for information and bulletins on Kyle apparatus and complete coordination—single- and three-phase—from substation to load. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

255

LINE MATERIAL Kyle® Reclosers

A McGRAW ELECTRIC COMPANY DIVISION



L-M's Round-Wound transformers provide more capacity for heavier short-time overload without sacrifice in transformer life. Because L-M's obround design is lighter, smaller, and has less bending moment than round tank design, three 167's can be hung on a two-pole structure in place of three 100 kva transformers of older design.

For Heavier Commercial Loading

Why L-M Round-Wound® Transformers

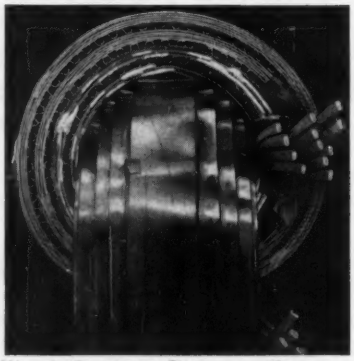
Core-type construction with cruciform cross-section core and round coils provides the most efficient design for lower hot-spot gradient, greater capacity for short-time overload.

By **ROBERT P. THOMPSON**
Manager of Engineering
Transformers
Line Material Company

One of the primary factors that limit the overload capacity of a transformer is the efficiency with which heat from the coils can be dissipated into the transformer oil. Particular care was taken, therefore, in the design of L-M Round-Wound transformers, to assure greatest exposure of coil surface area to cooling oil, and least obstruction to oil circulation.

Cruciform Cross-Section Core

The core is wound of a continuous strip of oriented steel, of varying widths, to form a core of nearly round cruciform cross section. The cruciform cross section of the core provides natural oil passages for cooling between core and coils.



Natural oil passages between cruciform core and round coil help to dissipate the heat from the coils more rapidly. In addition, ducts between windings and between layers in most sizes provide additional oil circulation.

Round Coils and Cooling Ducts

L-M's long round coils expose a relatively large and highly efficient area to cooling oil. Because of this, they provide greater overload capacity than rectangular coil types. In addition, ducts are provided for oil passages between windings and between layers in most sizes, giving exceptionally uniform cooling for the coils.

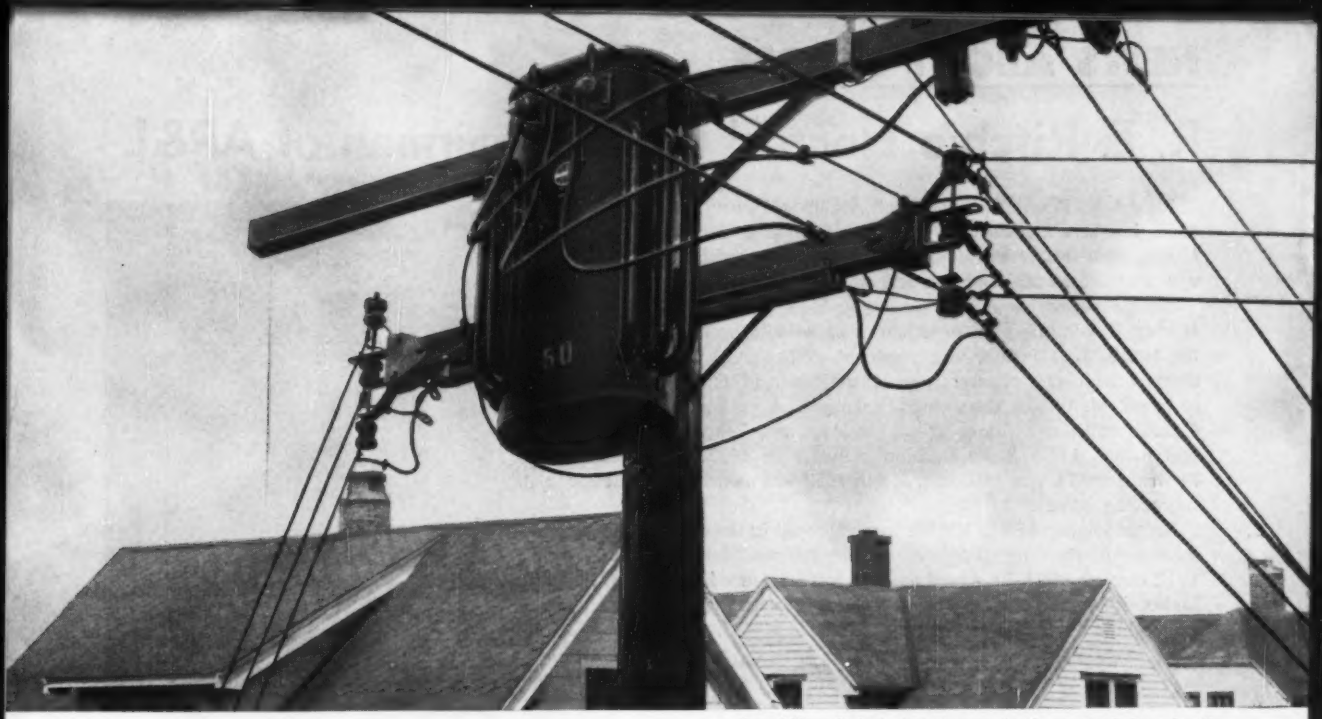
Core-Type Construction

In comparison with shell-type construction, L-M's core-type Round-Wound transformer has greater outer coil surface exposed to cooling oil; therefore coils are cooled more rapidly and uniformly. The cooling surfaces of shell types are partly blanketed by core steel; oil circulation is more obstructed.

Lower Hot-Spot Temperature, Higher Overload Capacity

Because L-M's Round-Wound design provides more efficient dissipation of heat from the coils to the oil, it has appreciably lower hot-spot temperatures during overload. This permits higher short-time overload, or longer overload periods, or greatly increased over-all life of the transformer.

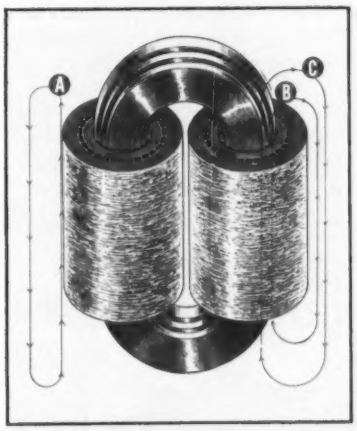
LINE MATERIAL
A McGRAW ELECTRIC COMPANY DIVISION



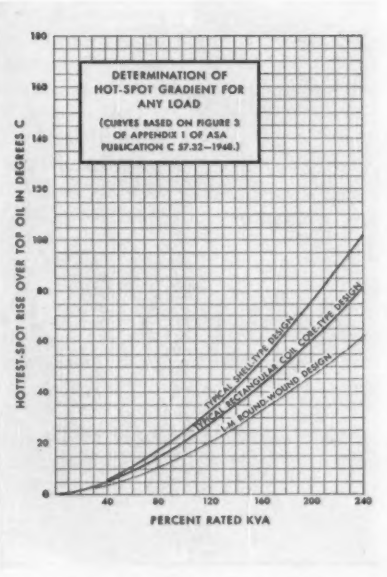
Round-Wound's high short-time overload capacity helps solve the more difficult *summer* overload problems in residential areas. The efficient cooling system in L-M transformers keeps hot-spot temperatures lower under high short-time overloads, increasing the capacity for overload and reducing the possibility of insulation damage.

For Heavier Residential Loading

Have Higher Overload Capacity



Because L-M transformers expose large, unobstructed areas to cooling oil on the outside of the coil (A), between core and coil (B), and between windings and layers (C), heat is dissipated into oil more rapidly and uniformly during overloads.



The higher the gradient at rated load, the more rapid is the rate of increase in the gradient with overload. Note that L-M's Round-Wound transformer, with a *lower* temperature differential (gradient) between hot-spot and top oil at rated load, has a greater capacity for overload.

Get Complete Information

Ask your L-M Field Engineer for complete information on L-M's Round-Wound design, and bulletins. Or write Mr. Thompson at Line Material Company, Transformer Division, Zanesville, Ohio.

Transformers

Five Reasons Why More Customers Are Selecting L-M Round-Wound Transformers

1. **Higher Uniform Impulse Level:** Round coils are *wound* into shape. Therefore insulation is not damaged by malleting into rectangular shape. Coils have longer creepage distance between windings and between leads.

2. **Higher Short-Circuit Strength:** Round coils are not stressed out of shape under high radial short-circuit forces. Strong steel frame, heavy clamping bolts, sturdy maple blocks and varnished coils prevent axial movement.

3. **Higher Short-Time Overload Capacity:** Round coils and the cruciform cross-section core expose large surfaces to cooling oil. The result is relatively low hot-spot temperatures, which add considerably to high short-time overload capacity.

4. **Balanced Performance:** The core is a continuous wound strip of oriented steel. Coils are wound directly onto this core. Since the core is not cut, unwound, or disturbed in any way after annealing, there are no air gaps to break up the flux path. This results in low exciting current and core loss.

   The wound-core, round-coil design permits fewer winding turns and smaller turn diameter. This results in low impedance, and provides better regulation at all power factors.

5. **Additional Capacity on Pole:** L-M's new obround tank design makes the unit smaller and lighter, with shorter moment arm from the pole. This combination reduces the bending moment on the pole and crossarms, and thus greatly increases the potential capacity of existing transformer structures.

NEWS ABOUT PEOPLE

R. E. Ritchie Elected Board Chairman of AP&L

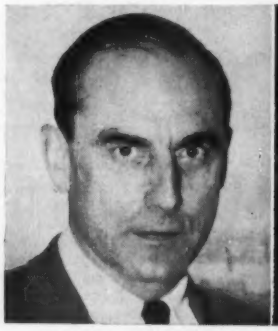
Robert E. Ritchie, president of Arkansas Power & Light Co since 1952, has been named chairman of the board to succeed C. Hamilton Moses, who has retired to return to his law practice (p 10). Ritchie will continue to serve as president of the company.

Ritchie began his AP&L career in 1923 as chief clerk to the late Harvey Couch, founder of AP&L and Middle South companies, and the late J. L. Longino, vice president. When AP&L was reorganized through the merger of several smaller utilities in 1926, he became assistant to Frank M. Wilkes, then general manager. A year later he returned to Couch's office as assistant to the president, and kept that title when he was named Little Rock Division manager in 1935. Five years later he was elected a vice president, and in 1952 was named to the presidency, succeeding Moses.

Before joining AP&L, Ritchie was employed in the office of the general manager of the Fort Worth & Denver Railroad for two years. From 1912 through 1923, he served as clerk for the Santa Fe, Texas & Pacific, Missouri-Kansas-Texas, and St. Louis-Southwestern Railroads. He attended Polytechnic College, Fort Worth, Texas.

ROBERT E. RITCHIE

A&FP Names Nelson, Cussen Vice Presidents



W. STEWART NELSON

JOSEPH J. CUSSEN

Two newly elected vice presidents of American & Foreign Power Co, Inc, are W. Stewart Nelson and Joseph J. Cussen.

Nelson has been president since last year of Cia Auxiliar de Empresas Eletricas Brasileiras. In this post he is chief executive officer for the Brazilian operating companies in the A&FP system. He has been with the firm since 1934 and has also served as managing director of properties in India and Colombia.

Cussen, chief executive officer of Chile operations, has been with companies affiliated with A&FP since 1926 when he was employed by Cia Cubana de Electricidad. Since 1951 he has served as vice president of Cia Chilena de Electricidad, Ltd.

I-T-E Ups Mackenzie to Vice Presidential Post

I-T-E Circuit Breaker Co has announced the appointment of A. E. Mackenzie as vice president and general manager of its newly acquired subsidiary, Kelman Electric & Manufacturing Co.

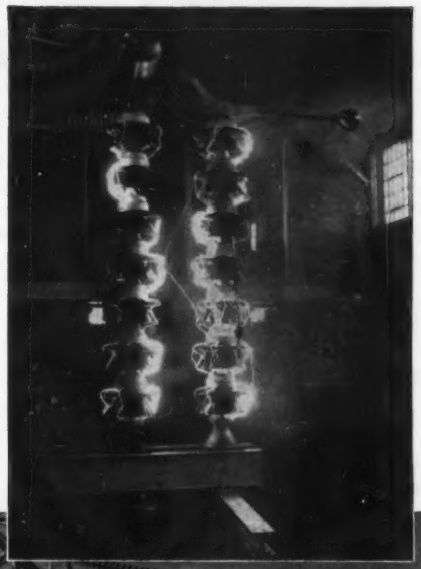
Until his recent appointment Mackenzie was district manager of I-T-E's New York office. Before joining the company in 1944, he was engaged in manufacturing and plant management in the Northwest. He is a graduate electrical engineer from the University of Washington.

Other organizational changes resulting from the acquisition include the promotions of John H. Kuhns and James E. Bevan.

Kuhns, who has been with I-T-E's R&IE Equipment Division for more than 35 years, replaces Mackenzie as district manager in New York. And Bevans, formerly a market specialist, becomes assistant district manager of the New York office. He has been serving in sales and engineering capacities for I-T-E for the past seven years.

A. E. MACKENZIE

330-kv switches built with O-B Pincaps



Standard O-B pincap insulators exceeded every mechanical and electrical test called for in the design of these 330-kv air-break switches. Materials were examined thoroughly -- complete 60-cycle wet and dry flashover and withstand, corona, and complete impulse testing guided the switch design, and eventually confirmed it.

Similar complete testing has confirmed the choice of O-B suspension insulators and hardware for use at 330 kv.

Since dependence placed on EHV systems is so great that the builders require materials of *proved* value, it is worthwhile to point out that only Ohio Brass Company maintains an organization which designs, produces, tests and evaluates the insulators and insulator-hardware combinations needed for EHV transmission.

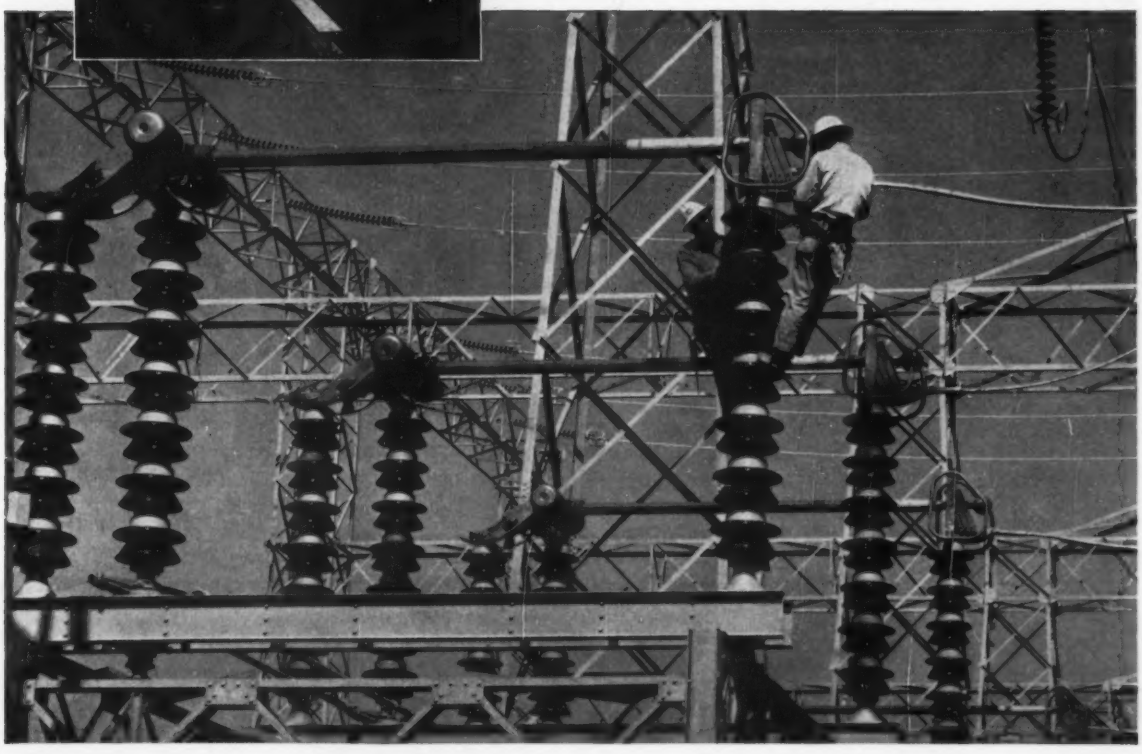
Constant use of these research facilities has shown us, and our customers, how to apply O-B materials at extra-high voltages. That research also assures you that the same materials are the best available for use at *any* voltage in your system.

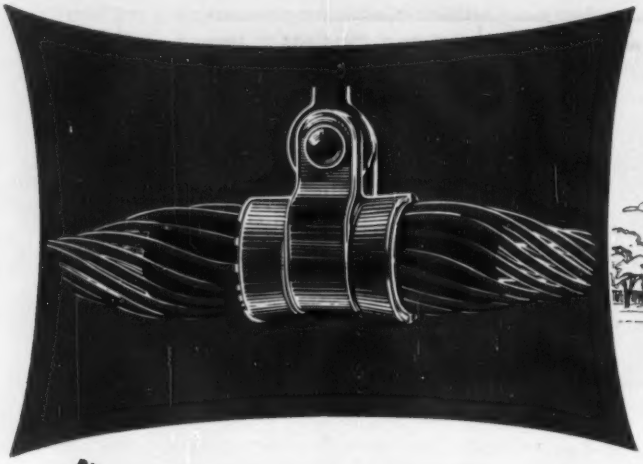
OHIO BRASS COMPANY • MANSFIELD, OHIO

IN CANADA: CANADIAN OHIO BRASS COMPANY LTD.
NIAGARA FALLS, ONT.

Ohio Brass

4668-H





"PERFECTING not PERFECTION is our goal" *

Yesterday's answers are not good enough. Today's will need improving tomorrow.

Take the problem of vibration fatigue. Failure of strand because of vibration or galloping does not occur in mid span. But it becomes a real problem at points of stress concentration, such as the end of the clamp keeper—at mass concentrations, such as at clamps, dampers and rigid splices—or at wearing points at loose attachments or fastenings.

Yesterday's answer—PREFORMED ARMOR RODS introduced by Preformed Line Products Company in 1947.

Today's answer—PLP PREFORMED ARMOR with pitch direction the same as conductor strand and pitch length less than that of strand (Patent No. 2,609,653). When used in conventional clamps:

- it extends uninterrupted conductor life
- it eliminates wear possibilities
- it prevents excessive mass and stress concentrations.

Tomorrow's answer is here today: the armor rod principle carried one step further in Preformed's ARMOR-GRIP SUSPENSION (Patent No. 2,722,393), the entirely new concept in suspension design.

The Armor-Grip Suspension Unit is a "floating suspension"—the conductor is cradled in neoprene and firmly gripped only by the custom-designed Preformed Rods which distribute their pressure over a relatively large area. The result: no wear possibilities—no mass concentrations—*and no clamping stress concentrations.*

This is another example of PLP research laboratories at work. Ever improving methods, materials and solutions is our goal. Call a PLP Representative today and ask for a demonstration.

* *John Dewey, "The Reconstruction of Philosophy"*

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

PLP

PREFORMED LINE PRODUCTS COMPANY

3349 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

TELEPHONE: CLEVELAND EXPRESS 1-3371

G. S. YOUNKIN | W. W. GILMORE | K. L. WILSON | S. F. KEATING | H. D. BISSELL

Minneapolis-Honeywell Appoints 8 New VP's

Five corporate vice presidents and three divisional vice presidents have been elected by Minneapolis-Honeywell Regulator Co.

The new corporate vice presidents are Gavin S. Younkin, previously general sales manager; W. W. Gilmore, president of the Micro Switch Division; Kentner L. Wilson, formerly manager of the Residential Division; Stephen F. Keating, previously vice president of the Aeronautical Division; and Herbert D. Bissell, former director of merchandising.

These newly elected officers will continue to hold their responsibilities in their respective areas of the company.

Newly appointed to divisional vice presidential positions are Melvin P. Fedders, Aeronautical Division; Charles B. Meech, International Division; and O. B. Wilson, Industrial Division.

PERSONAL BRIEFS

Potomac Edison Co has elected **Byron A. Winebrener** comptroller and **Galen C. Smith** assistant comptroller. Winebrener succeeds **Glenn T. Swisher.**

Newly formed research and development department of Philadelphia Electric Co has named **C. C. Farrell** as assistant to vice president; **Constantine Barry,** economic analysis engineer; **A. H. Kidder,** research engineer; **B. R. Nevins,** engineer in charge of testing; **J. L. Everett,** engineer in charge of mechanical research; and **E. S. Halfmann,** engineer in charge of electrical research . . . Other appointments, in the engineering department of Philadelphia Electric Co, made **J. A. Tenbrook** chief system planning engineer, **E. B. Shew** chief electrical engineer, and **J. H. Harlow** chief mechanical engineer.

Alfred G. Mehlman, former assistant plant manager of Appalachian Electric Power Co's Cabin Creek plant, has been promoted to manager of AEPCO's Philip Sporn plant at New Haven, W. Va.

R. L. King has resigned as personnel director for Kansas City Power & Light Co to be succeeded by **Philip L. Netzger,** former supervisor of labor relations and employment.

Bernard D. Eley, formerly industrial power engineer for Ohio Power Co at Mount Vernon, has been elected assistant industrial development consultant. Eley succeeds **Robert L. Wolf,** recently appointed industrial development consultant. **Carl L. Powers** assumes Eley's former post.

Appointments in Virginia Electric & Power Co's sales department made **C. F. Lane** manager of sales research, **P. D. Lawrence** manager of contracts, and **W. R. Black** agricultural development director. VEPCO has also named **T. B. Knox** director of industrial sales, **J. S. Ragland** director of commercial sales, **R. S. Gay** rate research coordinator, and **N. O. Wagenshein** rate application coordinator.

Portland General Electric Co has appointed **Leo E. Chaffin** and **Chester W. Jarrett** to the newly created positions of assistant general sales manager and illuminations sales manager, respectively. **Frank G. Mackaness** becomes manager of rural services.

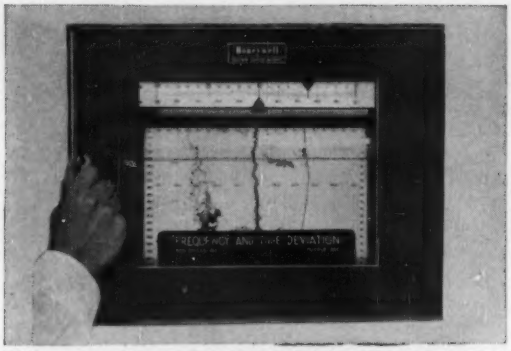
Pacific Power & Light Co has designated **Stanley A. Collins** as lighting sales director. Collins, former industrial and commercial sales specialist for PP&L in the Willamette Valley, will maintain headquarters at Albany.

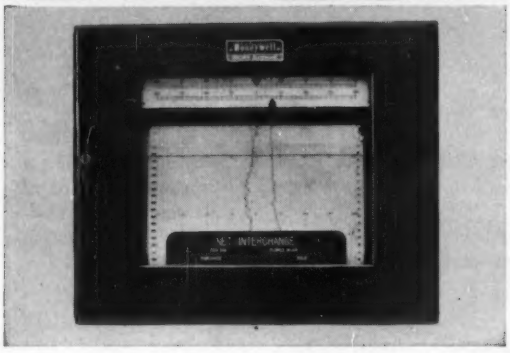
Harold A. Ketchum, financial vice president of Federal Pacific Electric Co, has been elected president of Controllership Foundation.

Westinghouse Electric International Co has named **H. J. Mauderer,** formerly vice president and auditor, as vice president and management representative in the Caribbean area . . . **A. J. Hendry** succeeds the late **Frank H. Clark** as sales manager in Westinghouse Electric Corp's Standard Control Division . . . Heat transfer apparatus department of the Steam Division has appointed **P. L. Fetzer** sales manager, **M. A. Nelson** engineering manager, and **W. E. Rudloff** manufacturing manager . . . **C. C. Franck** has moved from sub-division manager of large turbine engineering to consulting engineer in the company's Steam Division . . . **Bernard E. Lenehan** is new consulting engineer for the Meter Division both in Newark, N. J., and Raleigh, N. C.

Russell E. Bryant succeeds **Leonard G. Tandberg,** retired, as manager of Wagner Electric Corp's Electrical Division in Los Angeles.

Jake C. Marley is new manager of government sales for Federal Telephone & Radio Co's Apparatus Div.

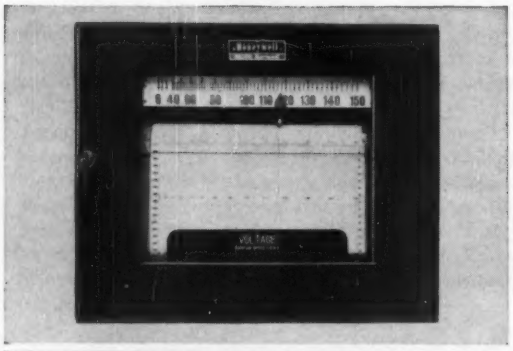


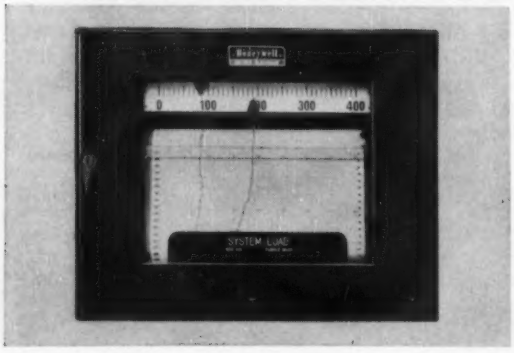


ElectroniK instruments can record...

- system load
- net interchange
- voltage
- frequency
- time deviation
- total generation
- station generation
- tie line loads
- sky illumination
- outside air temperature
- outside humidity
- wind velocity
- wind direction

Data recording instruments...to deliver dependably the facts your dispatcher needs





WHAT are the facts that your dispatcher should know, to keep up with what's going on in your system?

Variables important to him are listed above, and *ElectroniK* instruments record and indicate these variables with the precision, speed and sensitivity that you expect of Honeywell instruments . . . plus the dependability that you demand of all your equipment.

Your maintenance men will rarely have to perform more than periodic preventive service when *ElectroniK* instruments are at work. Every component is engineered for continuous service, with ample extra ruggedness. You can depend on *ElectroniK* instruments to deliver uninterrupted performance week after week. They have a reputation for staying on the job, in dispatchers' offices, power stations and in thousands of industrial plants.

Ask your local Honeywell field engineer to talk over the ways you can use these instruments in your own system. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:** Write for Bulletin 9070, "Instruments for Electrical Power Generation."

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

MEETINGS CALENDAR

SEPTEMBER

Northwest Public Power Association, Inc.—Meter School, Oregon State College, Corvallis, Oregon, September 10-14; Accounting Section, Cascadian Hotel, Wenatchee, Washington, September 11-14.

Edison Electric Institute—Home Service Committee, St. Louis, Mo., Sept. 12-13; EEI-AGA Accounting Division Organization Meeting, Edgewater Beach Hotel, Chicago, Ill., Sept. 13-14; Industrial Power Heating Group, Belmont Plaza, N. Y., Sept. 13-14; Commercial Division Executive Committee, Hotel Roosevelt, N. Y., Sept. 14; Street Lighting Committee, Hotel Statler, Boston, Mass., Sept. 19; Industrial Relations Round Table Conference, Hotel Statler, Boston, Mass., Sept. 17-19; Dealer Coordination Committee, Syracuse Hotel, Syracuse, N. Y., Sept. 19; Purchasing and Stores Committee, Executive Committee, EEI Headquarters, N. Y., Sept. 21; Market Research Committee, Cleveland, Ohio, Sept. 21; Meter and Service Committee, Purdue University, Lafayette, Indiana, Sept. 24-26; Farm Group Committees, Belmont Plaza, New York, Sept. 27-28; EEI-AGA Taxation Accounting Meeting, William Penn Hotel, Pittsburgh, Pennsylvania, September 27-28.

Illuminating Engineering Research Institute—Research Symposium on Light, Seeing, Living, Cornell University, Phillips Hall, Ithaca, N. Y., Sept. 13-15.

Maryland Utilities Association—32nd Fall Conference, Cavalier and Sir Walter Hotels, Virginia Beach, Va., Sept. 14-15.

Public Utilities Association Of The Virginias—38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15.

American Society For Testing Materials—Second Pacific Area National Meeting, Statler Hotel, Los Angeles, Calif., Sept. 16-22.

American Institute Of Electrical Engineers—3rd Annual Electrical Conference of the Petroleum Industry, Kansas City, Mo., Sept. 17-19; Fifth Annual Industrial Electronics Symposium, sponsored jointly with the Institute of Radio Engineers, Hotel Manger, Cleveland, Ohio, Sept. 24-25.

Illuminating Engineering Society—National Technical Conference, Hotel Statler, Boston, Mass., Sept. 17-21.

Instrument Society Of America—11th Annual Instrument-Automation Conference and Exhibit, New York Coliseum, Sept. 17-21.

Missouri Valley Electric Association—Accounting Conference, Lassen Hotel, Wichita, Kansas, Sept. 20-21.

Southeastern Electric Exchange—Engineering & Operations Section, John Marshall Hotel, Richmond, Virginia, September 20-21.

Atomic Industrial Forum, Inc—3rd Annual Forum Conference and 2nd Annual Trade Fair, Morrison Hotel and Navy Pier, Chicago, Ill., Sept. 24-28.

Pennsylvania Electric Association—49th Annual Meeting, Hotel Wm. Penn, Pittsburgh, Pa., Sept. 25-26.

Electric Companies Public Information Program—Steering Committee, Blackstone Hotel, Chicago, Ill., September 26; Workshop Conference, Blackstone Hotel, Chicago, Illinois, September 26-28.

OCTOBER

Edison Electric Institute—Prime Movers Committee, Radisson Hotel, Minneapolis, Minn., Oct. 1-3; Area Development Committee Meeting, Oct. 3, and Area Development Committee Workshop, Radisson Hotel, Minneapolis, Minn., Oct. 4-5; Electrical Equipment Committee, Hotel Statler, Cleveland, Ohio, Oct. 15-16; Transmission and Distribution Committee, Hotel Statler, Buffalo, N. Y., Oct. 18-19.

Illinois Institute of Technology—12th Annual National Electronics Conference, sponsored jointly by AIEE, Institute of Radio Engineers, University of Illinois, and Northwestern University, Hotel Sherman, Chicago, Ill., Oct. 1-3.

National Electronics Conference—12th Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill., Oct. 1-3.

American Institute Of Electrical Engineers—Fall General Meeting, Morrison Hotel, Chicago, Ill. Oct. 1-5.

Canadian Electrical Manufacturers' Association—12th Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada, Oct. 3-5.

Indiana Electrical Association—Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 3-5.

Missouri Valley Electric Association—Sales and Rural Conference, Hotel President, Kansas City, Missouri, October 3-5.

Southeastern Electrical Exchange—Sales Conference, Tides Hotel & Bath Club, St. Petersburg, Fla., Oct. 3-5; Accounting Meeting, Hotel Seville, Miami, Fla., Oct. 10-11.

Standards Engineers Society—Fifth Annual Meeting, Hotel Willard, Washington, D. C., Oct. 3-5.

International Association Of Electric Leagues—Sheraton-Cadillac Hotel, Detroit, Mich., Oct. 3-6.

Pennsylvania Electric Association—Electric Equipment Committee, Arlington Hotel, Binghamton, N. Y., Oct. 4-5; Hydraulic Power Committee, Mountain View Hotel, Greensburg, Pa., Oct. 4-5; Communications Committee Meeting, Fort Stanwix Hotel, Johnstown, Pa., Oct. 22-23; Relay Committee Meeting, Hotel Robert Treat, Newark, N. J., Oct. 25-26.

Rocky Mountain Electrical League—Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Oct. 7-10.

Interstate Power Club—Hotel Martinique, New York, Oct. 8.

Inter-Industry Farm Electric Utilization Council—National Power Use Workshop, Milwaukee Auditorium, Milwaukee, Wis., Oct. 15-16.

Iowa Utilities Association—Annual Management Conference, Hotel Fort, Des Moines, Iowa, Oct. 15-16.

American Institute Of Electrical Engineers—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24.

American Standards Association—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

University Of Texas—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

National Safety Council—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

National Association Of Corrosion Engineers—South Central Region Meeting, M & M Building, Houston, Texas, October 23-26.

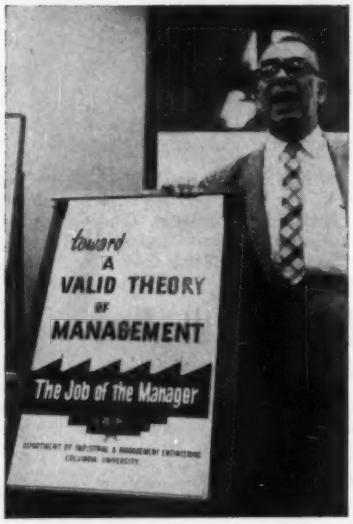
Northwest Public Power Association—Power Use Section, Franklin PUD Auditorium, Pasco, Washington, October 25-26.

Montana State Rural Electric Cooperative Association—Annual Meeting, Lewiston, Mont., Oct. 29-31.

NOVEMBER

Edison Electric Institute—Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Accident Prevention Committee, Statler Hotel, Hartford, Connecticut, November 26-28.

TYPICAL SCHEDULE shows sessions, study run from morning to night



PLENARY SESSION features Robert T. Livingston, director of the workshop

Teach Management Men To Make Fewer Mistakes

- **Utility Management Workshop at Columbia University emphasizes 'What Managers Do and How They Do It'**
- **Main objective is to make men realize magnitude of jobs**

"We're not trying to train crown princes," says Prof. Robert T. Livingston who directs the Utility Management Workshop at Columbia University. "We're training average guys to make fewer mistakes—even 5% less would be worthwhile."

That was the general idea behind the fifth annual workshop conducted for 31 management men from electric, gas, telephone, and water utilities on the Arden House Campus at Harriman, N. Y., last month. The two-week program was designed to get rising utility executives to chat in small informal groups and formulate and think out their own problems.

Situations Created for Solving

Objective of the workshop is to create situations where the executive will realize the overall magnitude of his job and stimulate approaches to solving problems as they arise in practice. Emphasis is not on "right" or "wrong" decision, but in making the best decision based on facts at hand and in relation to conditions at the time the decision is made.

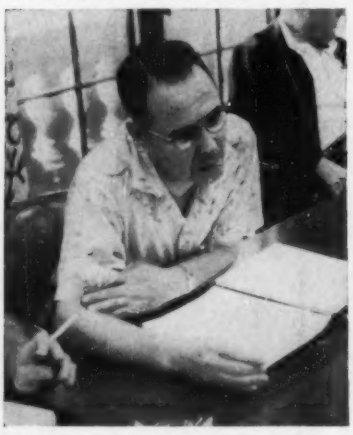
First order of business each day is a 90-minute plenary session at which the "expert" of the day presents an address. Allen Van Wyke (see cut), president, Illinois Power Co, was one such speaker. This expert tells of approaches to problems as viewed from his particular field. The large group then breaks up into three working units in separate conference rooms and the expert visits each group, making himself available for questioning and arguments.

After lunch, the three groups study their morning discussions and each formulates a major project or problem for the day and then goes about solving the problem, making use of an on-premise library, staff members, and the expert.

Evenings are devoted to either group or individual student work projects.

The Columbia workshop is one of three such projects undertaken to train future utility management. Other training courses are carried on at the University of Michigan and Georgia Institute of Technology.

OPEN DISCUSSION is invited. Hubert Joiner, Georgia Power Co, questions the speaker after an address



GUEST SPEAKER Pres Allen Van Wyke, Illinois Power Co, gives first-hand experience at session

SERIOUS STUDENTS are (left to right) Earle N. Scott, Laurence A. Dunn, and Lloyd C. Alexander at workshop meeting

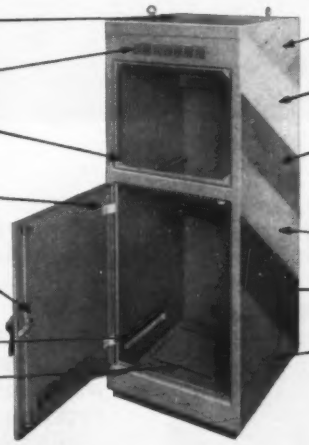
Does your maintenance crew spend Sundays servicing metalclad switchgear?

WHEN HIGH VOLTAGE switchgear gets rusty, power must be cut off for repairs and repainting. That means service work must be done on overtime, when the plant is not operating.

S&C believes that metalclad switchgear should be out of sight and out of mind—except on those rare occasions when it operates as a protective device, or when switching is necessary. The extent to which S&C goes to prevent rust and avoid switchgear maintenance is illustrated below. Only a detail? Perhaps . . . but a mighty BIG detail when less careful engineering can cause avoidable service work.

Here Is WHY S&C Metalclad Switchgear Resists Rust and Reduces Maintenance Costs

- Inside of top is coated with Insulmat ® to prevent condensation.
- Louvers are placed to provide free air circulation.
- Before welding, lapped and butted surfaces are zinc coated, eliminating bare surfaces which might rust.
- Hinges and edges, as well as bolt and latch holes, are zinc coated to assure protection of hidden surfaces.
- Hinge pins are stainless steel. Hinges, door locks, and other ferrous working parts are galvanized.
- Strip heaters prevent condensation.
- Underneath, surfaces are coated with water-repellent Texacote® to provide protection against ground moisture.



- Cold-rolled steel makes a scale-free, oxide-free base.
- All welds and sharp edges are ground smooth.
- Surfaces are thoroughly phosphatized to remove grease and provide a neutral, rust-resistant surface that assures good bonding.
- Zinc coating prevents rust from spreading in case surface is scratched.
- To make a good bond, zinc chromate is used for the prime coat.
- Finish coat is a new melamine-alkyd-urea synthetic applied by the hot-spray method and oven-baked at 375°. It has a thickness equal to four coats of conventional enamel or lacquer.

Specialists in High-Voltage Switchgear for Electric Utilities since 1910

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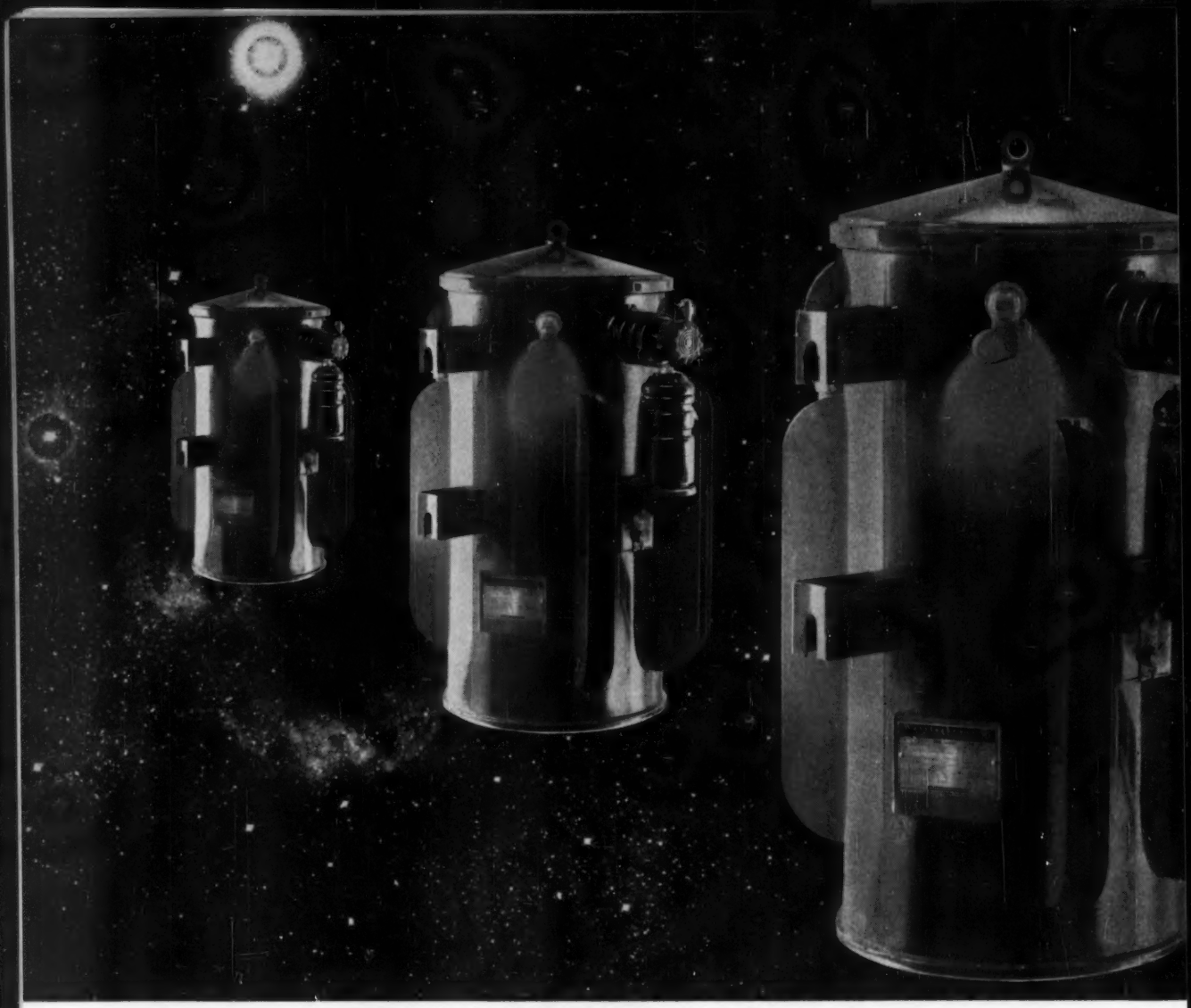
Consult your telephone directory. Sales offices in Birmingham, Boston, Buffalo, Chicago, Cleveland, Columbia (S. C.), Dallas, Dearborn, Denver, Houston, Huntington, Indianapolis, Jersey City, Kansas City, Little Rock, Memphis, Minneapolis, New Orleans, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, St. Petersburg, Salt Lake City, San Francisco, San Gabriel (Los Angeles), Seattle, Syracuse, Washington, D. C. In Canada: S&C Electric Canada, Ltd., Toronto, Ont.



The transformer that

"You can't test transformer life by just testing insulation," says A. M. Lockie, design engineer, who has developed the unique, new concept of functional life testing of distribution transformers at Westinghouse. For full description, see Lockie's AIEE papers, *Functional Life Expectancy Tests for Liquid-Filled Transformers* (55-520 and 53-243).

ACCELERATED LIFE-TESTS-TO-DESTRUCTION PROVE 20% INCREASED OVERLOAD CAPACITY OF WESTINGHOUSE TRANSFORMERS SAVE UTILITIES OPERATING DOLLARS

The new Westinghouse transformers already have a lifetime of success behind them. How is that possible? Through a revolutionary new concept of proving performance . . . a new concept in determining transformer life. This means that the new Westinghouse Type S and CSP® transformers have demonstrated in advance a phenomenal life expectancy in service.

Normal breaker settings on Westinghouse CSP transformers have been increased 20% — an additional 15% in the emergency range. The functional tests have demonstrated that this major increase in load capability has been achieved without sacrifice in normal life expectancy...an exclusive Westinghouse development.

What is behind Westinghouse functional life testing? Even more than three years . . . today's life-testing procedures are based on experience obtained from subjecting transformers to 2200 overloads, 30 short circuits at 15 times rated current, a series of impulse, dielectric and induced potential tests, and daily load cycles up to 450% of rating. Only Westinghouse can offer you a transformer with a pre-tested life.

lived 30 years in 3...

Proof? Here is proof never before applied to a distribution transformer. Complete transformers — not insulation alone, or subassemblies — but complete units have been put through repeated cycles of overload up to 350% of rated load. These tests were conducted under conditions representative of actual service. Aging was accelerated 10 times; 30 years of "normal" life were packed into three. Without a single failure, these transformers also survived periodic impulse, short-circuit and low-frequency dielectric tests.

And check-on-check proof . . . 10,412 Westinghouse transformers have operated successfully up to three years at the higher operating levels on distribution lines of three utilities in New York, Missouri and Texas. In 1954, 1955, 1956, these transformers lived through not only tough load cycles but also severe heat storms — and still delivered a caliber of service never equaled in a transformer.

The result? Reliability of Westinghouse transformer ratings has been conclusively established. This is "functional life testing" at Westinghouse. By giving a few transformers a short and rugged life test, Westinghouse can assure you that the many you buy will have a long and predictable life . . . give you long and dependable service. Specify Westinghouse.

Call your Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-70777

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN

ON CBS TELEVISION AND RADIO!

Cartwheel Caleb Plugs Safety

Toledo Edison Co recently attained the coveted accident prevention goal of a million man hours without a lost time accident. Company personnel had been striving for a long time to reach it, and some think that the stimulus of their new accident prevention character, Cartwheel Caleb, deserves some credit for the accomplishment.

Cartwheel Caleb was originated more than a year ago by the employee magazine at Toledo Edison for the distribution of silver dollars to five employees each month who knew the current safety slogan appearing in Toledo Edison News and on the bulletin boards. Early in 1956 he made his appearance in the form of a statue. Conspicuous features are the body of the statue, which is in the form of a silver dollar, and the hard hat which carries the name Cartwheel Caleb.

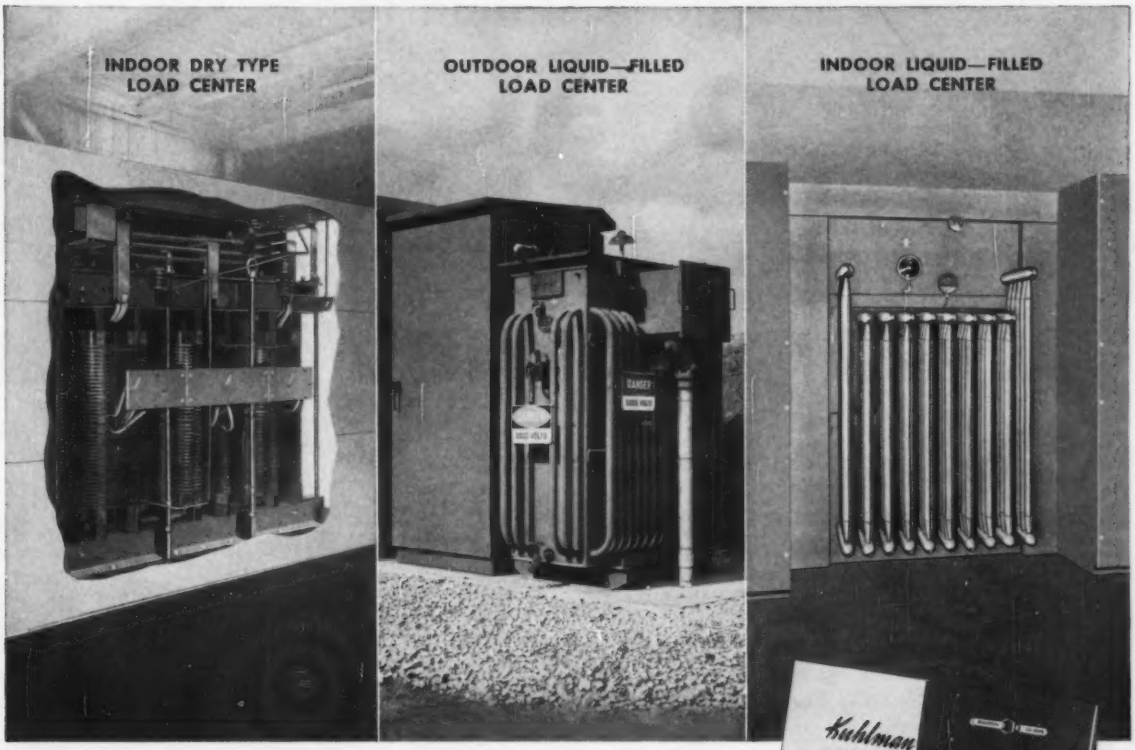
Statues 12 in. high were given to all departments to be kept until there is a lost time accident in the department. A 6-in. statue is given to each department each month until that department has a lost time accident. The smaller statues do not have to be returned.

Cartwheel Caleb statues have been used effectively by safety personnel and department heads to stimulate interest in accident prevention. As an example, W. H. Schwalbert, superintendent of transmission and distribution, placed the department's Cartwheel Caleb statue in a glass case and mounted it on a pole at the entrance to the service headquarters. At night a spotlight was placed on the statue.

When the department lost Cartwheel Caleb due to a lost time accident, the spotlight was kept on the empty glass case. A tearful Reddy Kilowatt was placed beside the case to mourn the loss of Cartwheel Caleb (see below). Rules of the game make it possible for Cartwheel Caleb to be returned by a good safety record.

Besides the million man hour record, Toledo Edison's 1956 record is a big improvement over 1955 for the same period. For the period Jan 1-June 30, there were only nine lost time accidents for a total of 98 days of time lost in 1956. This compares with 29 lost time accidents in the same period in 1955 for a total of 412 days of time lost.

NEW BULLETIN ON LOAD CENTERS SHOWS 3 WAYS TO REDUCE POWER LOSSES AND LINE DROP



Now you can get complete technical information on Kuhlman's three basic load center designs. For both indoor and outdoor service, they are ideal for all types of industries, commercial buildings or special job requirements. Compact, safe, modern—they can be installed near the center of the load. Thus, long secondary runs are eliminated and power losses reduced. This improves voltage regulation . . . increases lighting efficiency . . . makes motors easier to start.

Choose the Kuhlman load centers that fit your needs. Standard components provide numerous circuit combinations for either indoor or outdoor installations. This new Kuhlman reference bulletin, CS-1000, will give you all the facts. Get your copy—simply send the coupon below.

KUHLMAN
ELECTRIC COMPANY

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KUHLMAN ELECTRIC CO.—1002 26th St.—Bay City, Mich.

Gentlemen: Please send me the new bulletin, CS-1000, on Kuhlman Load Center Transformers.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

Allis-Chalmers . . . for Leadership in

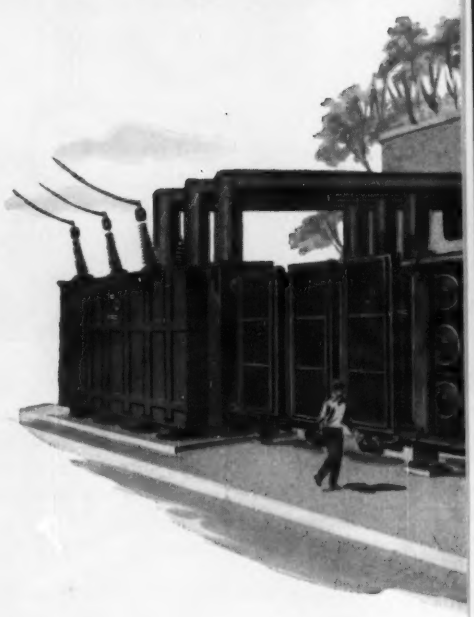
Philadelphia Electric Company Eddystone Station to Get

New Dual Cooling

for 400,000-Kva

Transformer Bank

Permits one transformer to carry practically entire load if second unit is out of service



This dual-cooled twin transformer arrangement is believed to be the first of its kind in the world.

Twin 200,000-kva Allis-Chalmers power transformers are to be used with a cross-compound steam turbine. Under normal conditions they will jointly take the full load.

Half the *Electro-Cooler* units provided will serve each transformer. But if one transformer is removed from the line and power is switched to one unit, all *Electro-Coolers* will remove heat from the one active transformer.

With the trend to higher kva ratings in transformers, use of twin units will simplify transportation, handling and installation. And single-phase reliability can be provided in three-phase equipment.

* * *

This is only one of many examples of Allis-Chalmers leadership in transformers. For further information about this interesting new development, call your nearest A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

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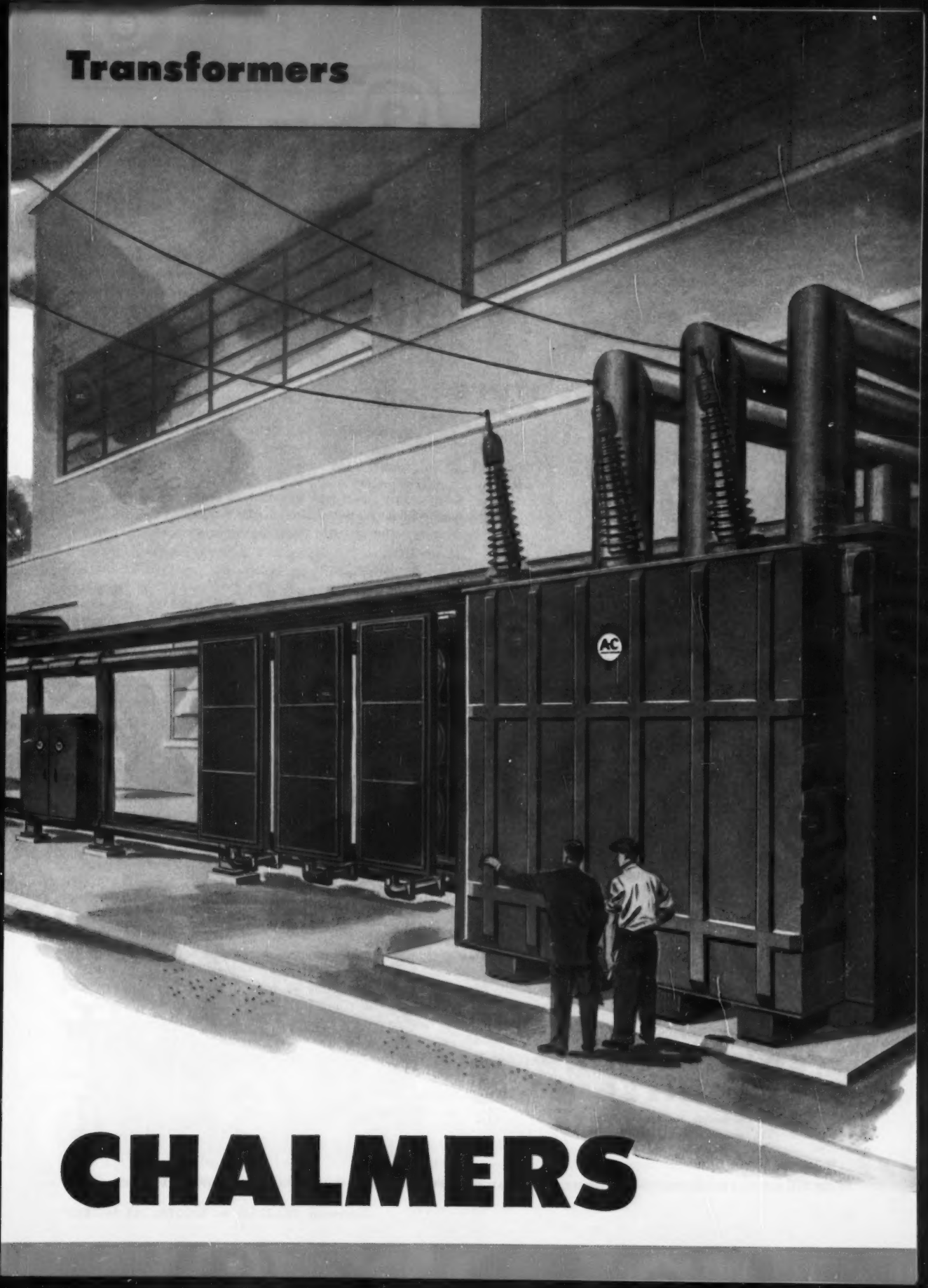
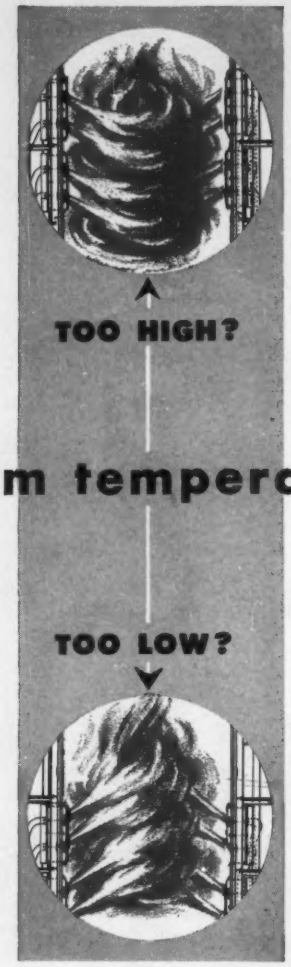
ALLIS-

Transformers



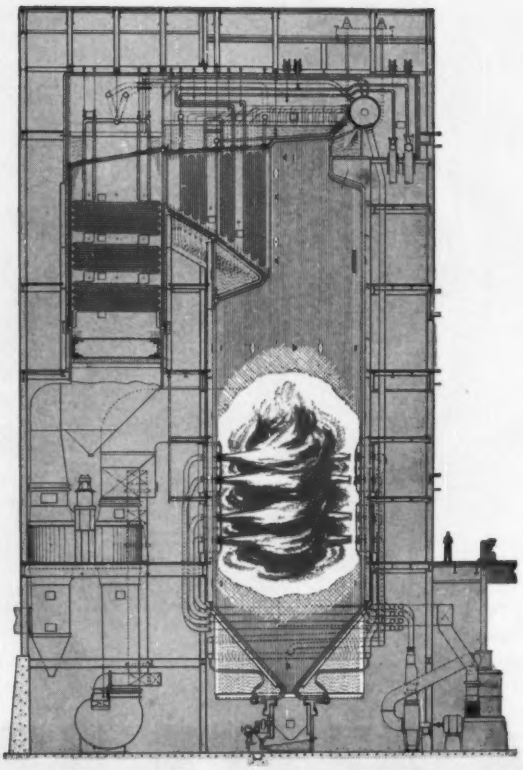
CHALMERS



THE BURNER WITH A BRAIN

Automatically the C-E Vertically-Adjustable, Tangential Burner nozzles tilt downward. More furnace wall surface becomes effective. Gas temperature to superheater is lowered. *Steam temperature comes down.*

Conversely, if steam temperature drops below that most efficient for the turbine, burner nozzles tilt upward, sending hotter gases to the superheater—*automatically.*



RESULT—less need for desuperheating . . . minimum use of spray water . . . less chance of fouling turbine blades. Turbine availability is higher . . . efficiency is maintained.

Modern, high-pressure, high-temperature power generating units need the highest quality steam possible. That's exactly what they get with C-E Tangentially-fired Boilers.

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LP Gas: The Bottled Curse

9 million electric customers are using it, 13 million will in '66. Here are ways to help brake its progress

How badly is LP gas cutting into suburban and rural electric markets?

There are nearly nine million electric customers right now who also have LP gas service. In comparison there were about 5½ million six years ago and less than one million in 1940. This year it is estimated that over 5½ billion gallons will be sold—an 8% gain over 1955 and a 57% increase over 1950. And the LP gas industry says it will sell 9 billion gallons annually ten years from now to 13 million customers.

The More LP, the Less Kwhr

These were the alarming statistics served up last month by W. J. Ridout, Jr, editorial director, "Electricity on the Farm" magazine, to a Niagara Mohawk Power Corp sales meeting. "LP gas," he said, "is the greatest threat we have today to the growth of kwhr sales in rural areas."

Program Sells Electricity

What to do about it? Ridout came up with a 10-point program based on a study of sales practices followed by utilities in various parts of the nation:

1. Make a thorough study of existing sales programs and promotions. Slight alterations or amendments might be all that is needed.

2. Check to see if all allies are included. If not, suggest activities for these allies, specifically dealers, wiring contractors, builders, architects, county and home demonstration agents, vo-ag teachers.

3. Cultivate future customers. Set up youth programs and school activities.

4. Educate employees and get their participation. A well-informed employee in the operating or meter department adds another member to the sales department.

5. Use all avenues of advertising. Promote the use of electricity on the fence of an electric substation, a transmission structure or a generation plant. They are potential "billboards" already available along many major highway and secondary roads in your area.

6. Start a regular series of publicity articles for weekly and daily newspapers. Radio and television stations also are on the look out for good educational material.

Use Intensive Sales Campaigns

7. Use the campaign approach—sell intensively for specific periods. If special offers or incentives are practiced let them ride on the campaign, then withdraw the offers at the end of the period. Too often incentives to sales people and offers to customers are continued on and on until they lose their effect.

8. Sell your company's record of service. Continue to publicize the fact that continuous service at the proper voltage doesn't just happen. Tell your customers why. Service continuity, or lack of it in the minds of your customer, is a major factor contributing to wider use of LP gas.

9. Talk facts and figures in your sales program. Most times your rates make it possible to cook or heat water cheaper with electricity than with LP gas.

All-Electric Approach Good

10. Use the "all electric" approach. LP gas can be used for practically any application where heat is required. It can run irrigation engines, it can dry hay or grain. It can heat milkhouses. Even air conditioning units run with LP gas—there are at least two manufacturers of these units right now.

The most outstanding sales programs studied, said Ridout, all had one common denominator: A continuous survey of LP gas customers on their lines. One utility does it by assigning its meter readers to search out new LP customers while making their rounds. Sparked by a report from the meter reader either a dealer or company representative calls on every new gas user. "As a result," declared a spokesman, "many installations are short lived."

Reports another utility: "We have established the fact that our LP gas competition exists among our farm customers using less than 4,000 kwhr annually. Approximately 40% of our farm customers are in this group. While we do not have an accurate count, we estimate 12,000 of our 34,000 farm customers are using LP gas."

To carry out their sales programs, the power suppliers studied used a variety of approaches. Among them:

- Programs to equip all high school home economics departments with electrical appliances.
- Award programs for salesmen.
- Wiring subsidy policies for ranges, water heaters, and clothes dryers.
- Quick recovery water heater promotion.
- Free gifts and/or free electricity. One utility gives 50 free kwhr per month for six months upon purchase of dryer, plus special rate for water heaters.
- Electric space heating promotion.
- Loan of electric fry pans. One-week loan-outs (with cooperation of dealer and distributor) acquaint LP users with electric cooking.
- Safety. Hazard of heavier-than-air fuel is stressed. However, cautions Ridout, this approach can be loaded with dynamite if not properly handled.

S & S SHORTS

Georgia Power Goes to One Brand

Georgia Power Co, a direct merchandising utility, has announced it will specialize in the Westinghouse Electric Corp line, discontinuing all other brands of major appliances. The change will not affect its housewares and lamp lines, says C. M. Wallace, vice president. The company operates 104 retail stores in the state of Georgia.

Shallow Lighting Unit

A low-price, twin-lamp fluorescent lighting fixture said to be "shallower than a length of chalk, yet meets the IES School Lighting Practice" is announced by Benjamin Electric Manufacturing Co. Unit is 3 in. high by 10 in. wide and comes in 48 and 96-in. lengths.

Electricity reaches farm of Harvey Patberg, shown above (right) with WWP's Carl Van Hardenberg

WWP Gets Vote of Confidence as . . .

Stevens County Goes on Appliance Buying Spree

- **Five-month boom raises sales 62% over last year; increase tops national figure**

Few modern homes do not have refrigerators. Nor do most modern housewives press the family's clothes with an unwieldly gas iron.

But that's the condition that existed until very recently in numerous isolated rural homes in Stevens County, Washington.

Then, during the first five months of 1956, a revolution occurred in the way of life of the county residents—they went on an electrical appliance buying spree. Appliance sales in the county rose an average of 62.4% over the same period in 1955.

Why the sudden boom in electrical appliance sales?

The answer is simple—for the first time in their lives, many county residents were offered what in most homes is a necessity—electricity.

In November, 1955, 71% of the voters of Stevens County marked ballots in favor of selling their Public Utility District to Washington Water Power Co. On the day after election, WWP paid $2.7 million for the PUD and within a few days time, took control of its lines and equipment.

Soon afterward, the large-scale program to bring electricity to Stevens County began. Included in this program were extension of lines to customers without electricity, substation construction, and installation of street lights to areas without service.

With WWP lines and rates in effect, the shopping rush began. Obviously, scores of Stevens County families had nest eggs set aside for electrical appliances when the day came.

During this extraordinary five-month buying spree, sales of electrical appliances boomed, topping almost all such national sales (see chart).

"For five months our electric appliances were our leading department," says Robert L. Strauss, who, with his father Louis Strauss, operates dry goods and hardware stores in the county seat.

Strauss and other Stevens County merchants found no similar increase in non-electric items, although business has been good except in farm machinery.

The demand for electric service was so great after WWP bought the system that the company has been on the go ever since. In June alone, the office at Colville—the county seat—wrote more than 500 service orders, compared to a normal month's 150 to 200.

Two branch offices have been opened in the county, at Northport and Chewalah. The company is now installing new street lights and renovating residential service in Northport, a town which, in the midst of the bitter election campaign, had threatened to establish a municipal utility if the PUD won.

"We made a lot of promises during the campaign, recalls Robert T. Paine, Colville office manager, "and we mean to keep them before bad weather sets in.

Among the promises was extension of lines to customers who did not have electricity. In the Miles (Wash.) area, housewives threw out scrub boards, gas-driven washing machines, and oven warmed irons as WWP lines reached their homes. Other rural areas without service will have it before winter.

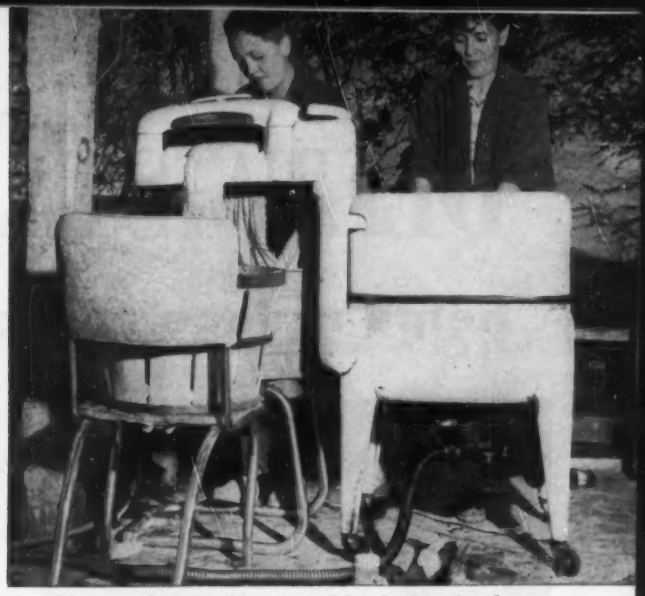
Per Cent Increase in Appliance Sales

(Five months of 1956 over same period of 1955)

	Stevens County	National*
Freezers	+90.0%	−6.2%
Clothes Driers	+40.8	+17.8
Water Heaters	+29.4	−2.1
Ranges	+28.8	−10.0
Refrigerators	+24.8	−12.4
Television	+23.6	−11.6
Washers—Automatic	+15.4	+6.7
Washers—Conventional	−11.0	+5.0
Radios	− 3.1	+28.5

*Source of National Figures: Electrical Merchandising Magazine, July, 1956, p. 6.

Mrs. Jess Dennison using gas iron before WWP extension brought electricity to her Miles, Wash., home



Gas-driven washing machine is used for the last time by Mrs. Joe Brisbois (left) and Mrs. Dennison

On July 18, WWP completed a new 5,200-kw substation near Kettle Falls to improve voltage throughout the area.

Along with its program to bring lines to rural areas, WWP also undertook a large-scale information and education program to familiarize county residents with electric service—its applications, advantages, and rates.

The utility helped tell the story of its own service throughout the county with a series of mail pieces and personal visits from service representatives. Each Stevens County home received a letter shortly after the election, telling them what WWP proposed to do, announcing that rates would be immediately lowered from the old PUD scale and pointing out that appliances could be purchased on credit.

Kinsey M. Robinson, WWP president, estimated that 1,819 "residential and rural customers were billed $7,582 less in the first normal month under WWP than they would have been billed under PUD rates as they were when WWP acquired the system."

Many of the county's customers had never been contacted by a sales representative. Company men have been on the run just working through their schedule of farm calls, where virtually all contacts are new.

These rural customers have also been put on the mailing list for WWP's monthly farm magazine, the "Farm News," and the staff reports a large number of Stevens County requests for a booklet on farm wiring offered in the publication.

WWP home economists have visited appliance stores and community meetings to demonstrate how to cook and keep house electrically, and WWP has augmented their appearances with direct mail promotion.

Although today there is every indication that the shopping spree has ebbed back to pre-election normal, county homes are now virtually saturated with various electrical appliances.

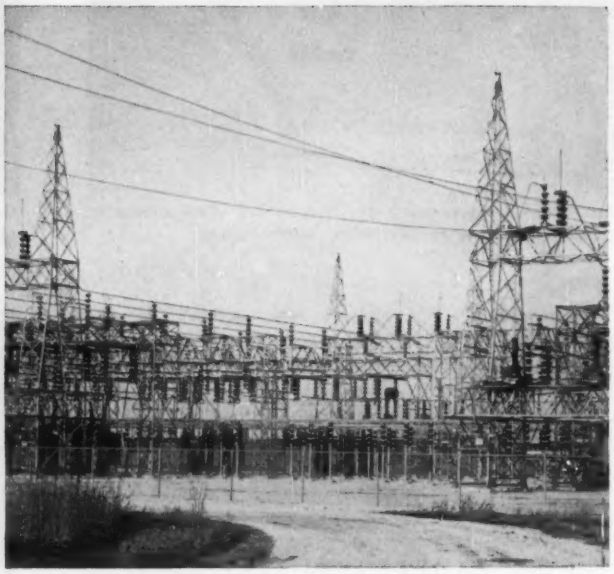
Residents' response to Robinson's invitation to build a load—WWP's first objective—has been almost a bigger vote of confidence than the 71% who voted in WWP's favor last November.

New customers in Miles area celebrate at picnic given by WWP after new lines gave them first electricity

Workers mount WWP decal on former PUD truck. Virtually all PUD employees joined WWP after election

DELTA-STAR

helps reduce outdoor substation costs



Gain specialized experience, engineering advantages, and complete satisfaction with DELTA-STAR on the job

When planning a new outdoor substation, take advantage of DELTA-STAR's standardized engineering and production methods. You save money in the process—and need not sacrifice your special requirements.

Simply provide a one-line diagram of your proposed installation—for any type of station or any voltage rating. Add information about ground space available, arrangement and height of circuits. DELTA-STAR engineers then go to work for you.

You receive complete construction drawings. When drawings are approved, steel structures are fabricated and galvanized under rigid DELTA-STAR engineering control. All component parts are made ready or provided from stock—from anchor bolts to switch operating mechanism. Assembly and erection is quick and easy.

The result? You hold engineering and erection costs to a minimum. You gain satisfaction of a job well done. To gain these advantages, check DELTA-STAR for your next installation.

When you want the best in outdoor substations, specify DELTA-STAR.

DELTA-STAR ELECTRIC DIVISION

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Centralia's Aim: A 'Blueprint for the Future'

A. B. Chance Co sparks a community development study that will both promote and guide Missouri town's promising growth potentialities

Centralia, Mo., is cashing in on its main resource—community spirit—to make 1957 more than just another mile post. Coinciding with the festivities of a centennial celebration will be the wind-up of a community development study. This study promises to influence Centralians long after the 100th anniversary oratory is over and forgotten.

Recently started by an independent research group, the four-and-a-half month project is modest in cost ($6,520) but comprehensive in scope. It will provide Centralia (pop. about 2,900) a blueprint for the future as it celebrates the past.

ABC Fills Cause-and-Effect Role

The town intends to promote growth while simultaneously avoiding any serious growing pains. Dominant reason for the anticipated growth is A. B. Chance Co, which can claim both a cause-and-effect role in Centralia's plans.

ABC's headquarters and pole line equipment manufacturing activities constitute most of Centralia's industrial base. In keeping pace with record-breaking electric utility growth, the company has added more than 200 employes in the past three years for a total of 500 local workers.

Led by President F. Gano Chance, son of the founder, ABC's management is putting in time and effort to more than match the company's financial aid for the study.

The community development project got its start last month with the birth of a Progress and Planning Committee made up of business, church, civic, professional and government leaders. The committee met to assess Centralia's growth possibilities and discuss what problems a sizable population hike would bring. President Chance offered the opinion that professional help like the company uses for future marketing and production plans would be the best take-off point.

After Midwest Research Institute had been picked for the job, ABC's president, by giving half of the total cost, started a snowballing series of contributions.

Follow-Up Is Pledged

Not content with just financing the project, committee members also signed pledges to follow through with action on recommendations that result from the study. The group will serve as an adjunct to the Chamber of Commerce.

The research group plans a four-stage approach:

1. Community inventory and appraisal of both assets and liabilities (ranging from the economy and cultural interests to traffic and zoning).

2. Detailed studies of special problem areas.

3. Analysis of present and future requirements.

4. Specific program recommendations for measures that municipal officials, civic and church groups, and business and industry can undertake for orderly development.

Population Could Double

This blueprint is viewed by Centralia's leaders as the cohesive force that may make a Midwest Research spokesmen's outlook a reality. He told the committee that the town's industrial base could sustain a population from 6,000 to 8,000, based on studies of communities with comparable industrial scope.

A. B. Chance Co, befitting its stature on the industrial scene, has been a leader in the community. The Chance Foundation, a charitable trust financed by the family and firm, has donated $50,000 for local school improvements since 1951.

The Foundation has also contributed to Centralia's churches, community chest and other non-profit groups. The gardens of the late founder's former residence are now visited by more than 10,000 persons a year.

Lapp Adds New Bushings in 15 to 69-Kv Range

Lapp Insulator Co, Inc, has announced a new series of high voltage bushings for transformers and circuit breakers at operating voltages of 15, 23, 34.5, 46 and 69 kv. The Leroy, N. Y. firm said the series follows an extended period of research and development.

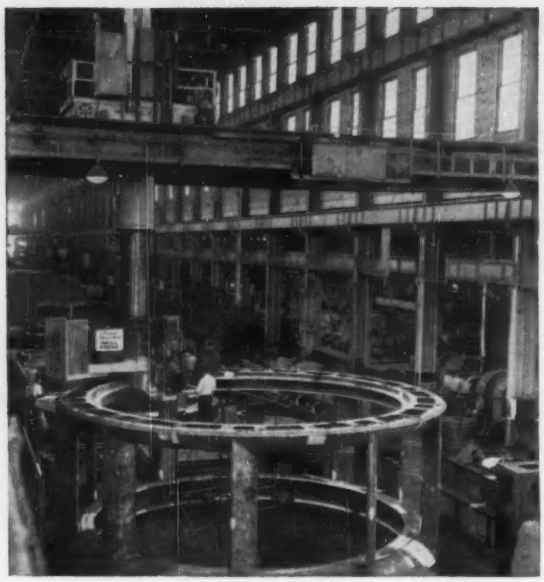
Bushings 23 through 69 kv conform with current ASA-NEMA standards, a company spokesman said. The bushings are completely sealed, paper-oil condenser-type design, he added, with condenser core surrounded by oil and enclosed in porcelain metal housings.

S&C Expands Chicago Plant

S&C Electric Co has increased manufacturing facilities about 30% at Ridge Avenue Plant in Chicago The addition, fourth in four years, aids in raising output of h-v fuses, load interrupters, and switchgear.

Cope, Inc, Consolidates

T. J. Cope, Inc, makers of expanded metal cable trough for supporting power and control cables, has completed a consolidation of operations. As a result production capacity will be increased four-fold. The executive, sales, engineering, production, receiving, and shipping sections are now located at the new Collegeville, Pa. plant. The move will also provide needed office space for the company's expanding activities.



Turbine Machining Speeded by Crane-Mounted Drill Press

Holes are being drilled in this 12-ft high stay ring for one of eight turbines for St. Lawrence River Hydraulic Project at Barnhart Island near Massena, N. Y. This machining operation is speeded by a crane-mounted radial drill press conceived by Allis-Chalmers Mfg Co's machine tool engineers.

Shown operating in Allis-Chalmers' main erection building, the crane's drill head and arm are supported from the overhead bridge carriage. This eliminates the need to block up large machines to drill, ream and tap holes in work pieces like this 31 ft 10 in. diam, 154,000-lb stay ring.

Each of the fixed-blade propeller hydraulic turbines being built for New York State Power Authority will deliver 79,000 hp at 94.7 rpm under an 81-ft head, Allis-Chalmers reports. The units' propellers will have 20 ft diam—among the largest ever designed in this country.

The dam and the power house at the project are scheduled for completion during 1958 and 1959.

Alcoa Develops Joining Tool for Single-Core ACSR

A plier-like tool developed by Aluminum Co of American provides a time and cost-cutting technique for joining smaller sizes of single core ACSR, according to a recent announcement.

The 1½-lb tool forms hooks in the steel core of sub-transmission and distribution ACSR sizes from No. 6 to 2/0 inclusive and other conductors with similar core sizes. An aluminum sleeve is then centered over the joint and compressed. The completed connection has a minimum of 95% of conductor strength and offers low electrical resistance, the announcement stated.

The hook joining method reportedly saves up to 42% in sleeving No. 4 ACSR.

'Pole Topper' Repackaged for Easier Application

Osmose Wood Preserving Co of America, Inc, has culminated 18 months of research on its Pole Topper compound with a new packaging approach. The product now consists of an individually wrapped pad of material, reinforced with loose weave cloth, mounted on a cardboard applicator with handle slots.

The company says that application, once the lineman is positioned, takes less than a minute. A minimum 10-yr protection span, Osmose states, is their conservative estimate for the compound.

Fuel Cell Is Studied At Union Carbide Lab

The fuel cell, a battery that produces electricity from such gases as hydrogen and oxygen, is one device under study at National Carbon Co's Parma, Ohio, basic research laboratories. Ultimately the cells may be used for reserve or standby power supplies, a spokesman for the firm said.

A division of Union Carbide & Carbon Corp, National Carbon will dedicate the new lab Sept. 18. It is the seventh research center built by the parent company, which last year spent $43 million for research.

Precipitation Firm Gets Order for Gas Cleaner

Western Precipitation Corp, Los Angeles, has been awarded an order by United States Steel Corp for a system to control open hearth dust and fumes at the Homestead (Pa.) District Works.

The gas cleaning system, reportedly the largest yet to be designed, includes electrostatic precipitators for 11 open hearth furnaces.

Dust from all the furnaces will be collected in a main flue system and conducted to central gas cleaning stations with electrostatic precipitators. This multi-million dollar project will have a completely automatic air pollution control system. It will operate from a remote station which will provide pushbuttom control of gas flow and dust removal.

Introduces Luminaire, Plans 4-Way Reflector

Wheeler Reflector Company's Street Lighting Division has announced the development of a 48-in. linear, low brightness mercury luminaire which produces IES standard street lighting patterns.

The firm also plans to introduce a 4-way crescent reflector that will reportedly embody new features and advantages.

NEP Plans Expansion

A new warehouse for electrical distribution systems, fittings and accessories is planned by National Electric Products Corp at Los Angeles.

ADVERTISEMENT

Overhead Cables for Distribution

CURRENT TRENDS

No. 6 in a series of articles

Up until the last decade practically all overhead distribution involved some form of open-wire construction. Probably the most advantageous factor justifying this procedure has been economy plus an acceptable experience record. Like everything else, times are changing so that it is no longer axiomatic that open-wire circuits must continue to be used for overhead power distribution. Therefore, a brief story behind some of the modern cable designs for these applications may be of interest.

The need for cable is unquestioned. Overcrowded poles, severe tree conditions, storms, public relations, regulation problems and appearance are some of the contributing reasons for this need. The cable industry in recognition of this need has developed suitable cable products for almost every overhead distribution job and the Rome Cable Corporation has played a most active role in this progressive development. Cable costs have been so reduced by careful design and use of new materials that installed economies now closely approach open-wire construction in many instances. Today's distribution engineer would be remiss if he did not at least consider an appropriate type of cable for his new or replacement overhead distribution circuits. Rome Cable is prepared to supply all of these products and associated engineering services.

Primaries

There is a definite trend towards aerial cable in the 5 kv to 15 kv range but it is difficult to conclude whether this trend is more in factory-assembled or the field-assembled variety, since there are merits for each.

In the 5 kv range the cost of cable compared to open-wire construction may not be too attractive when evaluated on the installed cost per mile of line, averaging approximately twice as much. In the 15 kv range this picture improves somewhat. However, if this comparison is based upon final installed cost per KVA this differential between cable and open wire is considerably narrowed. Naturally, there must be other determining reasons for using cable, such as improved appearance, resistance to storms, less tree trimming, better voltage regulation and greater reliability.

Preference for cable design in the 5 kv rating utilizes ozone-resistant rubber insulation (such as Rome Cable RoZone) with a suitable nonmetallic sheath (such as Rome Cable RoPrene or RoSeal) . . . unshielded and relatively easy to hot tap, particularly when the cable incorporates the "reverse-lay" feature. Economic preference for cable designs for the higher primary voltages, utilizes the same grade of insulation on each conductor covered with a bronze tape which serves as a combined shield and armor but makes "hot tapping" difficult and hazardous. These and other cables may be supplied with insulated copper or aluminum power conductors all properly bound to the correct Copperweld messenger as described in the new IPCEA-NEMA specifications for aerial cable or an equivalent type. Installation procedures for factory-assembled or field-spun cables are described in the technical literature as well as manufacturers' catalogs.

Secondaries

Until quite recently there has been relatively little activity or interest in using cable for overhead secondaries but several utilities have been investigating and experimenting with either field- or factory-assembled cables for this application. Joint pole construction, elimination of crossarms, reduction of hardware, ease of installation, improved appearance, storm resistance, improved regulation and less tree trimming are some of the features to be realized, provided final installed cost is not prohibitive.

It is here that aluminum, at least for the phase conductors, seems to offer definite economic and technical advantages since the lighter weight is a most useful feature for line construction. With the advent of the now popular Triplex construction for service drops the idea of a similar factory-assembled cable for secondaries has certain merits. For single-phase secondaries, this cable generally consists of two insulated aluminum conductors (usually #1/0 or #2/0 AWG aluminum) spiralled around a suitable neutral messenger.

When this cable is used on conventional 150-foot pole spacings the service taps can be made at or near each pole with special fixtures now available. However, it is obvious that greater savings are possible with increased pole spacings and "flying" midspan service taps made where possible or convenient. Prefabricated devices to accomplish these taps have been developed. Thus, the combination of Triplex secondaries and services offer a new and advantageous construction idea at modest cost.

When secondary sizes larger than #2/0 AWG are required, either spinning or a cable construction similar to primary aerial cable is suggested.

Services

The use of open-wire service drops is rapidly disappearing particularly in new construction and housing developments. Service drop cable, Type SD, utilizing concentric neutral has been too costly to merit universal acceptance unless some special feature such as reduced theft possibility was desired. Nine years ago the Rome Cable Corporation introduced the now popular neutral or self-supported Triplex type of service drop cable. This design received almost instant acceptance and has proven highly satisfactory. The power conductors, insulated with polyethylene or Neoprene, are spiralled around a neutral messenger in accordance with IPCEA recommendations.

Aluminum unquestionably offers economic and technical advantages for the power conductors and has become the general choice of metal for this particular application. A popular neutral messenger has been a reduced size ACSR but the idea of hard-drawn copper has been gaining favor, particularly where there is planning towards Triplex secondaries with Copperweld messengers in order to provide copper-to-copper contacts on the exposed neutrals. Consideration of this "combination" design is suggested.

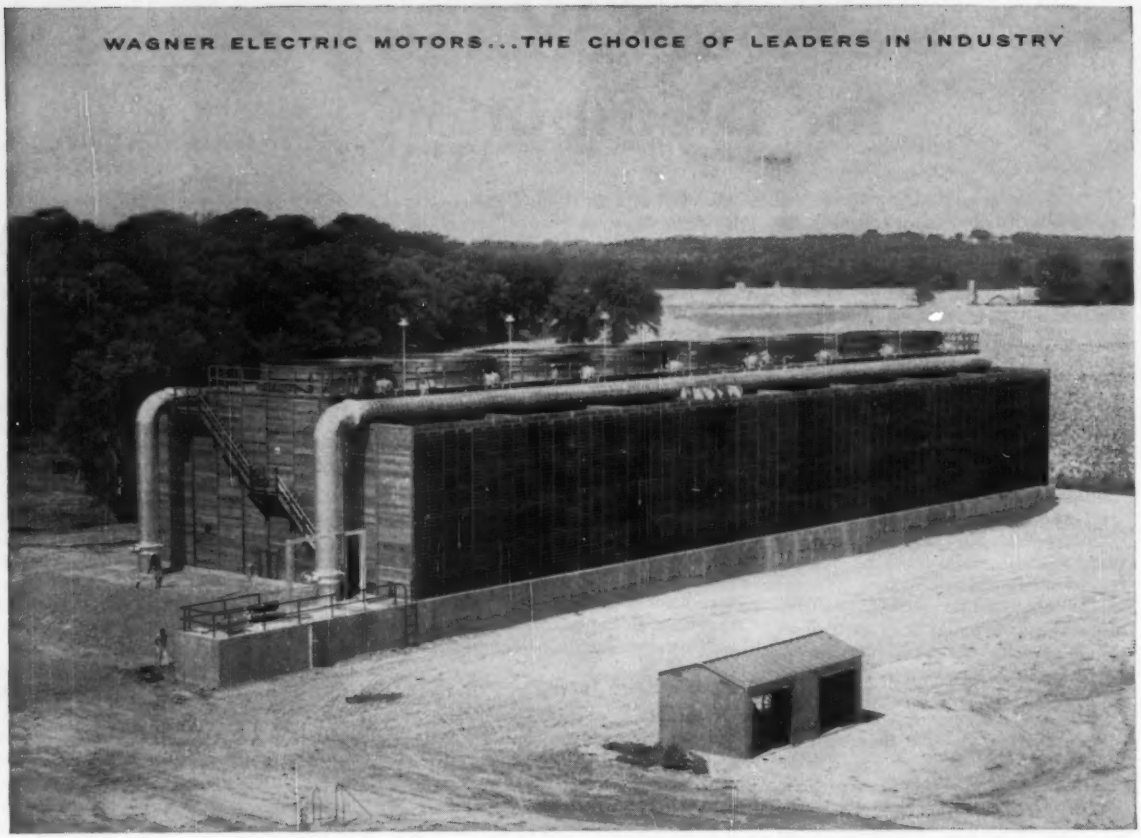
For further information on Triplex services or secondaries we suggest you obtain Rome Cable Bulletins RS-5 and MST-1.

Tree Wire

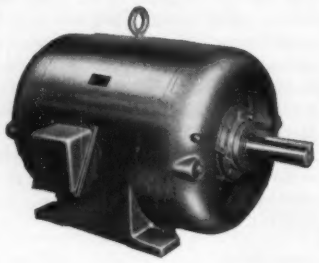
This discussion would not be complete without some reference to so-called Tree Wire installed on insulators for overhead construction. For primaries and unusually important secondary circuits this product would cost considerably less than insulated cable and somewhat more than weatherproof wire. Where extensive tree trimming is a problem or too costly the use of the newer low-cost special thermoplastic Tree Wire designs might be considered. Here, again, Rome Cable is ready with the information and the product.

ROME CABLE CORPORATION, Rome, New York

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



Giant Water Cooler—powered by Wagner Motors



Wagner Type EP—Totally-enclosed fan-cooled motor. Corrosion-resistant frame. 40 to 250 hp.

Marley Cooling Tower cools 44,000 gallons of water per minute for The Kansas Power and Light Company

This eight cell cooling tower for a power company steam plant supplies a constant flow of cooling water to lower steam pressure beyond the turbine to get more kilowatts per pound of steam.

Each of the eight 240 inch fans in this tower is driven by a 50 hp Wagner totally-enclosed fan-cooled motor.

Wagner type EP Motors are well suited to rugged, hard driving, outdoor applications like this. Their totally-enclosed, corrosion-resistant cast iron frame construction protects them from the elements. They have the winding strength required to stand the shock of starting heavy loads repeatedly and the mechanical and electrical stamina to keep operating, without attention, day after day.

This exacting application is one of many where specialized requirements are met from the complete line of Wagner standard motors.

Whatever your requirements may be, there is a Wagner Motor to fit every need—a complete line for all current specifications, with a wide variety of enclosure types and mountings. Your nearby Wagner engineer can help you select the *right* motors for your needs. Call the nearest of our 32 branch offices, or write for Bulletins MU-132 and MU-203.

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WH56-8

Kennecott, Koppers Plan Uranium Deal

A joint proposal to produce uranium feed materials for Atomic Energy Commission will be presented by Kennecott Copper Corp and Koppers Co, Inc. If approved, the companies would design, construct and operate a processing plant with a 5-ton annual production capacity. Each firm would furnish 50% of equity capital for construction.

The dual proposal stems from the policy change in 1955 Atomic Energy Act which expanded scope of private business participation in the program.

AEC announced last month it is seeking one-year proposals for supplying 2,000 to 3,500 tons of magnesium as of July 1, 1957. Other five-year proposals for about the same tonnage to begin in 1958 will also be considered. Deadline is Nov. 16, 1956.

Meanwhile, AEC extended a contract with National Lead Co four years to operate AEC's Fernald, Ohio, feed materials production center. The cost: $38 million.

CE to Build Submarine Prototype

A $10-million submarine nuclear power plant will be built on Combustion Engineering, Inc, property at Windsor, Conn., AEC has announced. The prototype will be located at CE's Nuclear Engineering & Development Center now being built by Stone & Webster Engineering Corp.

Firms Cash In on Isotopes

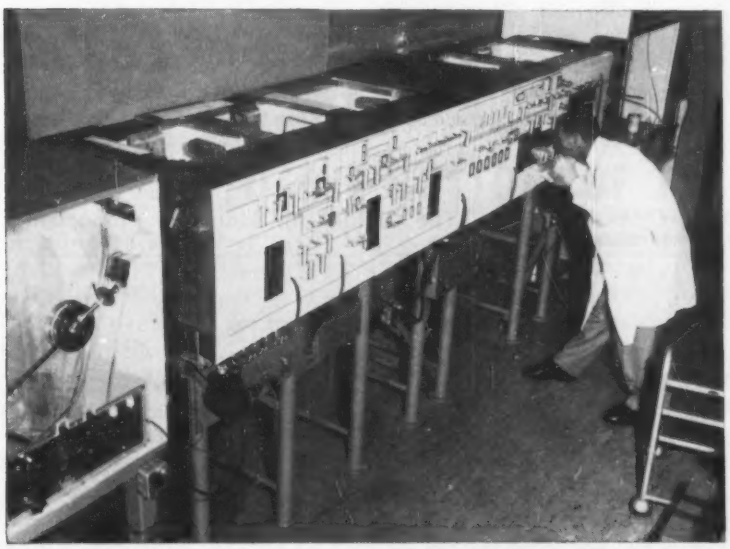
Industrial users of radioactive isotopes have increased over 500% in past five years, according to Atomic Industrial Forum, Inc, survey. Applications of radioactive materials currently save industry $200 million annually (based on AEC estimates) and by 1965 will save about $1 billion a year. Research and testing groups are big users and manufacturers of electrical equipment, electronics and instrumentation are next. More than 1,000 firms are now using atomic by-products.

Oak Ridge Shares Safety Award

National Safety Council presented an award of honor to the Oak Ridge Operations for its work in setting AEC's 1955 safety record. Frequency rate of AEC and contractors' accidental injuries was 2.01 per million man-hours worked, 29% below the average since 1952 and 40% less severe. Oak Ridge frequency rate was 2.52 (all-industry rate was 6.96). There were 10 fatalities in the atomic energy program last year, none due to radiation. Atomic energy program's fatal injury rate of nine per 100,000 workers compares with 24 for over-all industry. Oak Ridge had three fatalities in 1955.

Crane Forms Atomic Unit

Crane Co, Chicago, Ill., has set up an atomic energy unit in its engineering sales section. The unit will service inquiries and orders for valves, fittings and other equipment in the atomic energy field.



SMALL-SIZE PLANT developed by General Electric Co engineers at Hanford atomic plant duplicates most actual facilities for chemically separating plutonium from uranium that has been irradiated in a reactor. Although small, the prototype weighs 30,000 lb because of heavy lead brick walls which absorb radiation

M&M BRIEFS

International Business Machines and **Sperry Rand Corp** have reached a non-exclusive licensing agreement to exchange licenses to manufacture punched card accounting machines and electronic data processing machines, after a year's negotiations.

Ray-O-Vac Co recently gained listing on New York Stock Exchange.

Graybar Electric Co and **General Electric Co's** Lamp Division marked 60 years of distributor-manufacturer relations recently.

Aircraft-Marine Products, Inc, has moved executive, administrative, sales and advertising and product management divisions to new Harrisburg, Pa., quarters. New branch offices in Maplewood, N. J., and Cincinnati, Ohio, have also opened.

Sylvania Electric Products, Inc, announced these items at the Los Angeles WESCON show:

- A Wamoscope cathode-ray tube that combines most of essential functions of microwave receiving set in a single tube envelope.
- Opened a Special Lamps Application Laboratory at its Vail Field Los Angles facilities. Purpose is solving problem in movie and airfield lighting fields.
- A ferrite image rejection filter used in microwave receivers to elminate signal reception at undesired frequencies.
- Low-power transistors for computer and computer circuit switching applications.

BUSINESS OUTLOOK

Electrical World
SEPTEMBER 10, 1956

The loudest cry of distress from business today stems from the tight money market. High-grade utility bonds are still going at better than 4%—highest since the early 1930's. Borrowers are being turned away from banks, and corporations are backing away from the securities markets. And there are no signs that the tightness will be relieved this year.

Behind the tightness is the soaring demand for credit touched off as business picked up steam last year. Mortgage debt outstanding rose by $16.4 billion between the end of 1954 and 1955, corporate securities outstanding by $7.2 billion, commercial and industrial loans by $6.4 billion, and consumer credit by $6 billion.

• • •

Expansion of this magnitude puts heavy pressure on the resources of lenders. And neither new savings nor release of Federal Reserve money came fast enough to keep up with demand. This pushed up rates on short-term loans and long-term bonds. The short-term market has been under especially heavy pressure this year. **To avoid long-term commitments at high rates, many corporations have financed expansion by bank credit.**

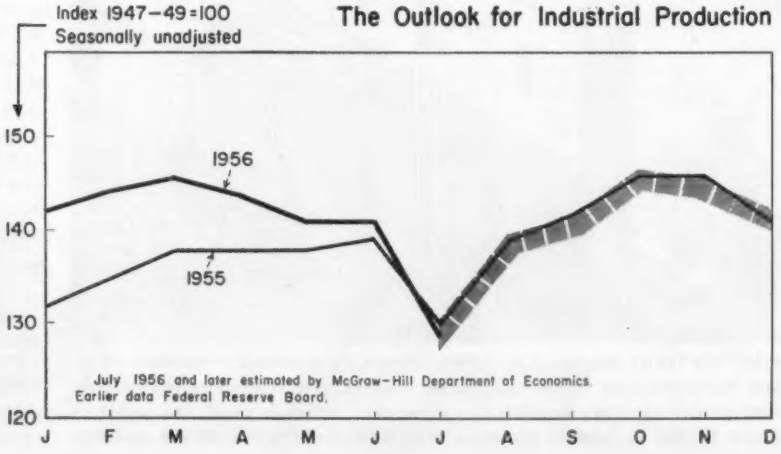
The scarcity of money dumps a devilish problem in the hands of the Federal Reserve Board. **The Fed is legally bound to expand money in line with the needs of the economy. But it will not endorse inflation.** Many lines of industry today are turning out goods as fast as capacity permits. If the Fed eases the strain on the money market, it will create more effective demand and encourage price increases.

• • •

That is why the Fed has once again employed one of its weapons of persuasion —the discount rate—to discourage a further increase in bank loans. The Fed will manage its open market operations, however, so that banks can meet the normal seasonal working capital needs of business that shoot up at the end of the year. **But marginal customers and those who are trying to finance plant expansion on bank credit will go begging.**

The scarcity of credit is not likely to squash the boom. Some corporations will temporarily postpone capital improvement plans. But few are likely to cancel them. **The capital goods boom should be a strong prop to business for a long time.**

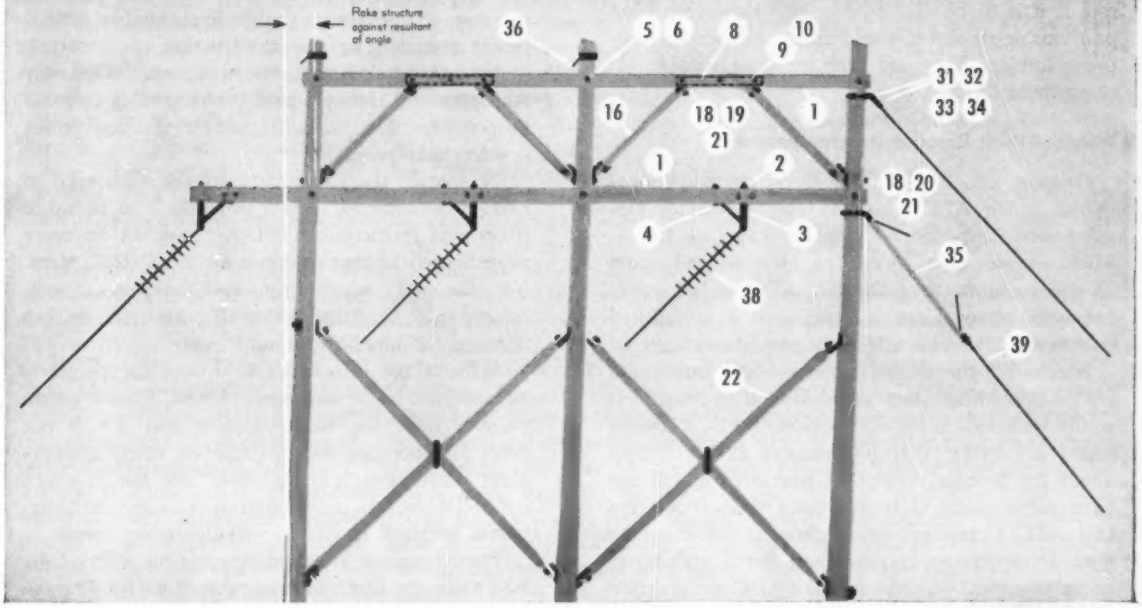
The Outlook for Industrial Production



SMALL ANGLE STRUCTURE TYPE NO. 706

NORMALLY USED FOR ANGLES OF 4° — 15°. ADAPTABLE FOR VOLTAGES FROM 69 TO 154 KV

DRG. REF#	QUANTITY	DESCRIPTION	DRG. REF#	QUANTITY	DESCRIPTION
706	3	Pole	21	7	MF locknut ⅞"
1	4	Crossarm	22	2 sets	Cross base w/fittings, clamp, ⅞" pole bolts, and curved washers
2	3	Spacer fitting w/mfg. bolts			
3	3	Swinging angle bracket			
4	3	Saddle w/mfg. bolts	31	4	Pole band
5	6	Stud bolt ⅞" w/2 washer nuts	32	4 pr.	Connecting link
6	12	MF locknut ⅞"	33	1	Guy roller
8	2	Filler block	34	1	Machine bolt ¾" x 2½"
9	6	Stud bolt ¾" w/2 washer nuts	35	1	Wood guy strain insulator
10	12	MF locknut ¾"	36	2	Suspension clamp for static wire
16	4	Knee brace			
18	7	Machine bolts ⅞" w/sq. nut	38	As required	Suspension insulators and fittings
19	4	Flat washer 4" sq. x ¼", 15/16" hole	39	–	Guying material
20	2	Curved washer 4" sq. x ¼" 15/16" hole			



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Is Reactor Safety a Campaign Issue?

There are rumblings that nuclear power plant safety may be one of the issues injected into this fall's political campaigns. If this issue should develop, it will involve the industry in maneuvers which the Democrats would like to aim at the Atomic Energy Commission and its chairman, Adm Lewis L. Strauss.

It appears more likely that Democratic campaign plans will relegate such a matter to a relatively minor role if it is to be discussed at all. However, some partisans argue that it would make newsworthy campaign fodder. They see such an issue shaping up along these lines:

Would Attack Breeder Reactor Permit

Opening attack would center on the conditional permit which AEC issued to Power Reactor Development Corp for its plant at Lagoona Beach, Mich.—seven miles north of Monroe and some 25 miles southwest of Detroit. AEC said it would not issue an operating license until it is satisfied that the plant meets all safety requirements.

Meanwhile the Democrats have been building a record upon which they could launch an attack. It would be based on the observation of AEC's reactor safety committee that not enough is yet known about the breeder reactor to guarantee it will not be a public hazard. It was upon this observation that AEC Commissioner Thomas E. Murray, the lone Democratic appointee on the Commission, chose to dissent on granting the PRDC construction permit. Two Democrats in Congress, Sen Clinton P. Anderson, New Mexico; and Rep Chet Holifield, California, have called public attention to the matter and voiced their own disapproval of the permit.

In their convention platform, the Democrats promised "To conduct a comprehensive survey of radiation hazards from bomb tests and reactor operations to determine what additional measures are required to protect existing and future generations from these invisible dangers."

But Democrats Promise Development

On the other hand, the Democratic platform also promises to "accelerate the domestic civilian atomic power program by the construction of a variety of demonstration prototype reactors." Certainly Anderson and Holifield have been the most vigorous proponents of a more aggressive nuclear power development program.

Of course, the Democrats do not undertake to explain how nuclear power progress is to be made if onerous restrictions are to be imposed on every project such as they propose for the PRDC plant. Yet, the party which originated the phrase, "calculated risk" must realize that all gains in the nuclear field are accompanied by some risks.

Actually the safety and health of the public is not involved in the issuance of PRDC's construction permit. AEC has made it clear that it will not grant an operating license until all safety requirements have been fully satisfied. The risk is taken by PRDC which must fulfill AEC safety requirements before it can obtain an operating license.

The long-range effect of bringing the safety issue into the campaigns might very well be to slow the nuclear power progress now being made. It is impossible to reconcile such an effect with the progressive, "new America" theme which the Democrats have adopted for their presidential campaign.

TECHNICAL NOTES

Maximum 60-cps voltage at a lightning arrester is determined by system grounding, loss of neutral, and load rejection.

Station-service transformer impedance can be boosted moderately to suit fault limitations of smaller circuit breakers when resulting voltage drop does not exceed operating requirements.

Automatic load shedding avoids complete shutdown of an industrial power plant when left with excessive load by failure of parallel utility supply.

Adding a third conductor to the bundle would enable the Swedes to operate their EHV transmission at 500 kv without excessive RI. A four-conductor bundle could operate at 650 kv.

One spare exciter can serve an entire station if all generators are designed for the same excitation voltage and reasonably similar current requirements.

Flexible braids give best current capability when terminated in massive ends and run vertically with hollow-square configuration.

Tighter Money: The Squeeze Is On (*Continued from page 9*)

• Hardest hurt are small companies, but one out of five big companies report they are being pinched.

• Though most companies are still ready to go ahead with their expansion programs, one out of ten have revised or are revising their plans, and three out of ten say that if money remains as tight as it is they, too, may change their programs.

Democrats are exerting some political pressure on behalf of easier money. Their platform warns about the effect of tight credit on farmers and small businesses, for example, some Democratic spokesmen have criticized the last round of interest increases. But there is no sign that this is affecting the FRB or the Administration.

According to most economists, there is nothing in the economic picture which would lead one to believe that there will be any slowing down in the pace of industrial development.

There is every indication that the automobile industry is planning to stage a substantial recovery in 1957. This, in turn, makes the outlook for steel a very optimistic one.

At the same time retail sales have retained satisfactory levels throughout the summer and are expected to advance sharply during the fall.

Gross National Product (total dollar value of all goods and services) has increased more than $6 billion since the first of the year.

A dip in business which the Administration forecasters had expected in the present (third) quarter failed to materialize. Instead the economy is off on another round of expansion, and is expected to pick up speed for the rest of the year.

The Consumer Price Index has begun to move up substantially, renewing inflation fears.

Thus, while the economy is continuing to expand, inflationary pressures are being developed through continuing increases in wage scales to all segments of industry. Such devices as the escalation clauses for the cost-of-living increases in the General Motors Corp contract and in the steel settlement all tend to produce inflation. The single fact is that as long as wages increase at the rate of from three to three and one-half times the increase in the rate of productivity, inflation must inevitably result.

This is the setting for the latest rise in the discount rate, and for the increasing high cost of borrowing. Unless the setting itself changes—that is, unless the economy slows down the present rate of growth—tight money and high interest rates are what both the FRB and the Eisenhower Administration think the country needs.

The problem, as far as the electric utilities are concerned, is the need to meet the requirements for service. While bond financing may not be too palatable at the moment, it should not be forgotten that even a 4½% or 4¾% only amounts, in effect to 2¼% or 2⅜% after taxes. In addition, if there is a substantial downturn in bond rates, electric utilities may still be able to refinance and consequently the increased costs of money is certainly not a permanent burden which the utilities will have to bear.

Electric utilities should continue to "stop, look, and listen" (EW, June 25, p 276) before proceeding with any but absolutely necessary funded debt financing.

As far as the sale of new common stock is concerned, the "green light" continues to shine brightly for issues expecting to need this kind of money.

Ted Locke, public utility analyst for Goodbody & Co, issued a research study recently that said:

"Our guess is that relatively tight money may continue for a while. New offerings may slow up and the market on outstanding issues may gradually adjust more closely to the yield on new issues. But the alternative to this tight money situation is more inflation, so our guess is that the Administration may hold the line for a time, even though it hurts badly only a few short weeks before the election.

"As to the permanency of the present higher money rates," he pointed out, "it is doubtful if a 4% prime rate is here to stay as yet, but it may come in time. Some easing of current rates seems likely whenever the Administration feels it advisable to do so.

"New issue yields on high grade bonds might get back to a 3.50%-3.60% basis. But a gradual increase in money rates has been going on for some time. Over the longer term money rates seem more likely to move up little by little than to decline importantly below 3.50%. Meanwhile, the present situation is likely to be eased before too long because it otherwise might become much too oppressive. But the easing may not occur right away."

FINANCIAL BRIEFS

Interstate Power Co will pay Sept. 20 a quarterly common stock dividend of 20¢ a share as compared with 18½¢ in the previous quarter.

Missouri Utilities Co has placed privately $1 million of 4% first mortgage bonds due 1979.

Consolidated Edison Co of New York is planning to sell $40 million in bonds on October 23 . . . Union Securities Corp group has sold quickly 80,000 shares of 4.64% cumulative preferred stock of **Central Illinois Light Co** at $100 a share . . . **Interstate Power Co** has received Federal Power Commission approval to purchase the distribution facilities of the Village of Triumph, Minn., for $135,000.

Federal Power Commission has just issued the 1954 edition of its annual publication on statistics of 306 Classes A and B publicly-owned utilities. For copy, write Office of Public Reference, FPC, Washington, D. C. The order number is FPC S-121 and the price is $2 a copy.

Goldman, Sachs & Co group has won an issue of $10 million **Tampa Electric Co** first mortgage 4⅛% bonds (Aa rating) due 1986 at 100.14%; the group reoffered at 100.947% to yield 4.07% . . . **Long Island Lighting Co** is now planning an issuance of $18 million of convertible preferred stock of $100 par to replace a previously proposed issue of $12 million of non-convertible preferred stock.

Future Financing

More Utility Issues Scheduled

An additional $240 million utility issues were scheduled on the fall calendar last week.

Utilities Keep Financing

While finance companies and municipal issues have been shying away from the higher costs of debt money, most utilities are going ahead with their financing plans.

September Calendar Heavy

September is being filled rapidly. The second week of the month will be a busy one for the underwriters. Electric and gas utilities have scheduled $190 million of offerings for September. There are offerings of over $760 million scheduled for the fall months by electric and gas utilities. Unless plans are changed there would be an additional $150 million utility issues added to the calendar. The only crowded spot so far is the week of September 10.

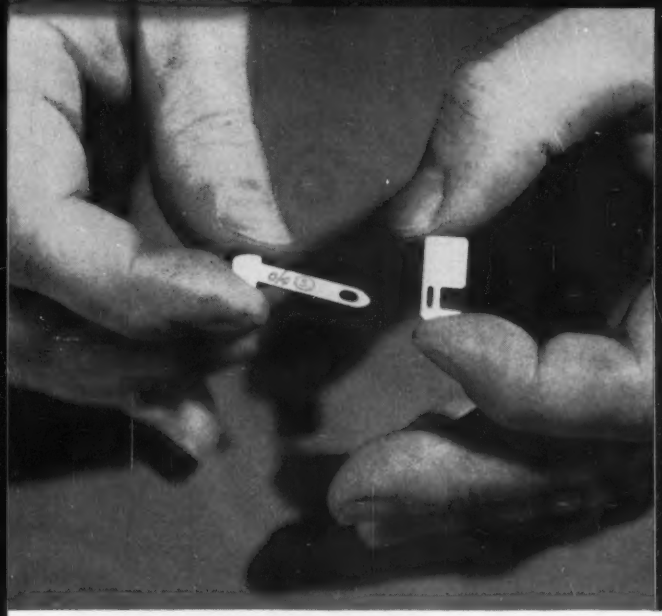
Due Diligence Meetings

September 10, Southern California Edison Co; September 17, Virginia Electric & Power Co; September 28, Columbia Gas System; October 17, Central Illinois Public Service Co; October 26, Ohio Power Co, and November 8, Public Service Electric & Gas Co.

(Furnished by the Irving Trust Co from the Financing Calendar)

DATE	COMPANY	Amount of Offering (Millions) DEBT	EQUITY
SEPT. 10	Gulf States Utilities	$15.0-C	$3.5-C COM
10	North American Aviation	.....	50.0-N-rt COM
10	Hawaiian Electric	.....	5.0-N Pfd
11	Blackstone Valley Gas & Electric	.....	2.5-C Pfd
11	General Telephone of California	20.0-C	.....
11	Southern California Edison	.....	26.0-N COM
12	Northern States Power	15.0-C	.....
12	New York City Schools	30.0	.....
13	Procter & Gamble	70.0-N	.....
13	State of Michigan	25.0-C	.....
17	United Aircraft	.....	33.0- -rt Pfd
18	Tennessee Gas Transmission	50.0-N	20.0-N Pfd
19	Southern Pacific Railway	35.0-C	.....
19	Wilson	20.0-N	.....
20	Allegheny Ludlum	16.0-N-cv-rt	.....
25	Peabody Coal Co	35.0-N	.....
25	Virginia Electric & Power	20.0-C	.....
26	Southern Union Gas	.....	3.0-rt COM
SEPT. No Date	Pennsylvania Tunnel	25.0-C	.....
	Jacksonville Expressway Authority	70.0	.....
	City of Memphis—Power Plant	135.0-N	.....
	Federal Land Banks	200.0-C	.....
	Long Island Lighting	.....	18.0- -cv-rt Pfd
3rd Quarter of 1956 (Month not indicated)			
	California Toll Bridge	34.0-C	.....
	Kansas Nebraska Natural Gas	5.5-P	.....
	U. S. Rubber	50/60.0- -cv-rt	.....
	Dade County, Florida	34.5-C	.....
	City of Dallas	40.7	.....
	Washington State Toll Bridge	227.0-C	.....
	Oklahoma Turnpike	63.0	.....
	Arizona Public Service	8.0-P	.....
	North Carolina State School	25.0	.....
	El Paso Natural Gas	30.0-P	.....
OCT. 1	American Telephone & Telegraph	.....	575.0- -rt COM
3	Columbia Gas System	25.0-C	.....
8	Southern Bell Telephone & Telegraph	60.0-C	.....
9	California Electric Power	8.0-C	.....
16	Public Service of Indiana	30.0-C	.....
23	Central Illinois Public Service	.....	5.7-C
23	Consolidated Edison	40.0-C	.....
30	Ohio Power	28.0-C	6.0-C Pfd
OCT. No Date	North-South Indiana Toll Road	220.0-C	.....
	Alabama Gas	7.0-P	.....
	Transcontinental Gas Pipe Line	.....	7.0- -rt COM
	Florida State Turnpike Auth	185.0-N	.....
	Texas Eastern Transmission	.....	15.0-N Pfd
NOV. 13	Metropolitan Edison	10.0	.....
14	Public Service Electric & Gas	50.0-C	.....
27	Carolina Power & Light	15.0-C	.....
NOV. No Date	Transcontinental Gas Pipe Line	20.0-P	.....
	Long Island Lighting	20/25.0-C	.....
	New England Power	10.0-C	.....
DEC. 3	U. S. Governments	9,100.0- -R	.....
DEC. No Date	Appalachian Electric Power	24.0-C	.....
	Essex County Electric	20.0-C	.....
	Delaware Power & Light	.....	6/8.0-C Pfd
	Public Service Electric & Gas	.....	35.0-
	Texas Eastern Transmission	40.0-N	.....
4th Quarter of 1956 (Month not indicated)			
	Otter Tail Power	5.0-N	.....
	Northern Natural Gas	20.0-N	.....
	Philadelphia Electric	30.0-C	.....
	Columbus & Southern Ohio Electric	.....	Some Pfd
	U. S. Governments	3,000.0*	.....
	Central Vermont Public Service	1.8-N	0.7-N COM
	American Louisiana Pipeline	.....	15.0-C Pfd
	Texas Gas Transmission	28.0-	.....
	Portland General Electric	16.0-P	.....

Symbols: C—Competitive; N—Negotiated; P—Private; R—Refunding; cv—convertible; rt—Rights; Pfd—Preferred; COM—Common. (a) does not include amount to be offered to parent company. *Estimated.

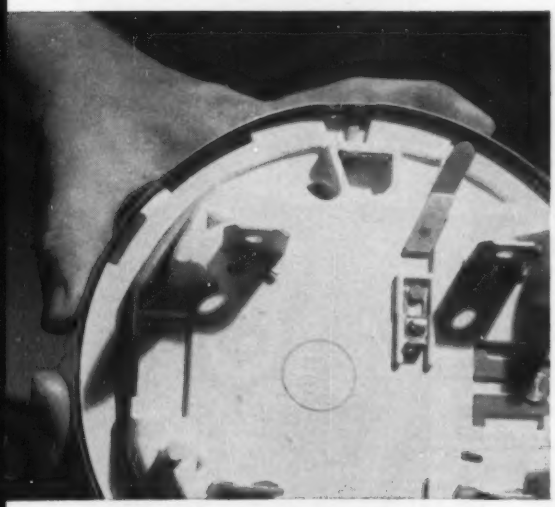


THE NEW SANGAMO OK SEAL is simple in design. It consists of two parts, made of almost pure aluminum and treated to resist corrosion.

SEALS ARE SIMPLE TO INSTALL. Sangamo meter sealing tools are available for you. But these seals can easily be closed with a screwdriver.

Ready for Shipment... and ready for use-

SANGAMO J2 METERS



NO MORE COSTLY THREADING OF LEAD SEALS. You can seal meters faster, cheaper with the Sangamo OK Seal. Your shop tested meters stay sealed—as calibrated.

When a Sangamo J2 Meter leaves the factory, it has been so accurately calibrated on the Sangamo Comparator that it is shipped *sealed*—ready for use. No adjustments are necessary. The Sangamo OK Seal assures accurate calibration.

This easily removed, non-reusable seal provides an economical means of sealing meters. It eliminates the time-consuming, costly threading of lead button seals both in the factory and in your shop.

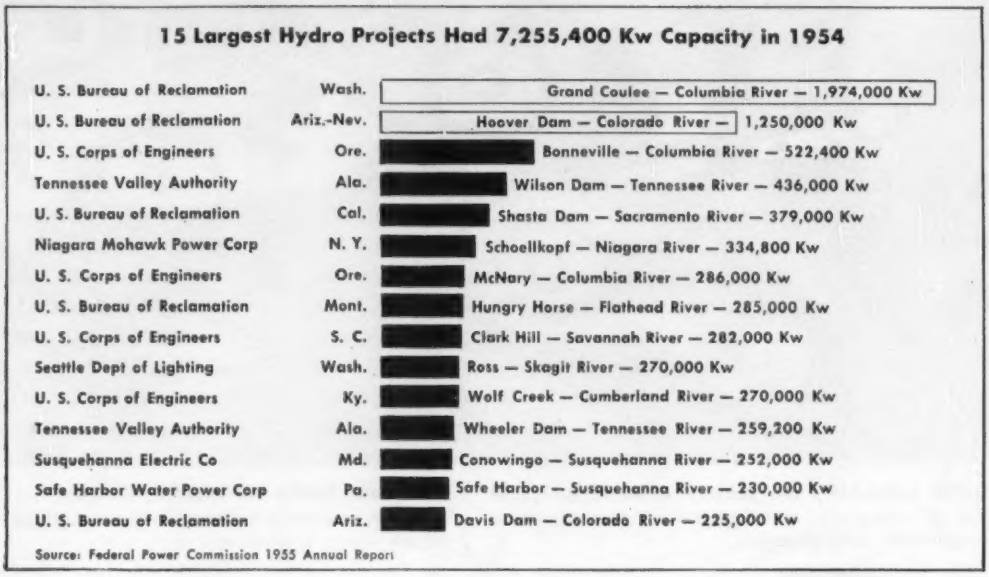
If Sangamo meters are opened, they can be easily and inexpensively resealed with the Sangamo time saving seal or with a conventional lead button seal. Sangamo OK Seals are competitively priced—available for your use. Write for further information and prices today.

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JM56-6

STATISTICS

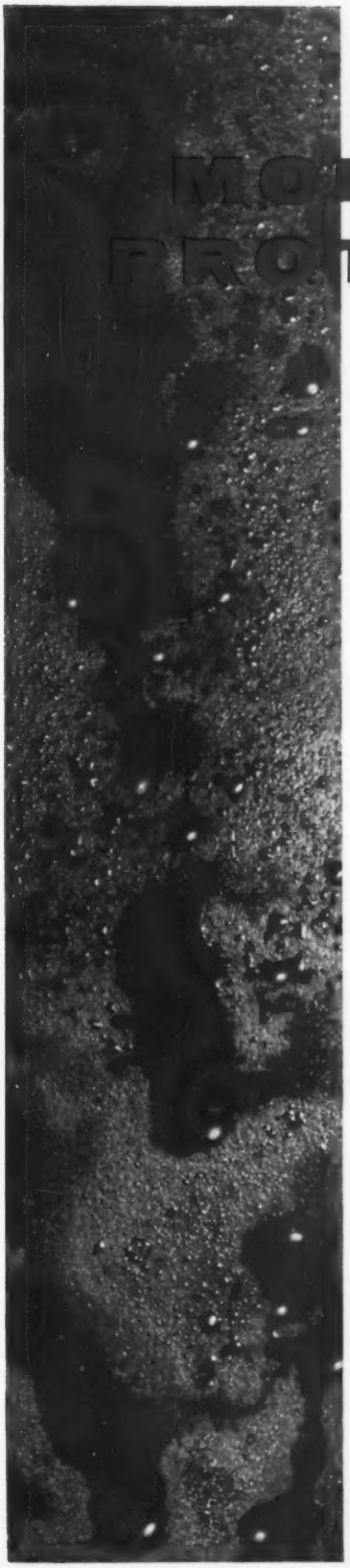

15 Largest Hydro Projects Had 7,255,400 Kw Capacity in 1954
U. S. Bureau of Reclamation Wash. Grand Coulee — Columbia River — 1,974,000 Kw
U. S. Bureau of Reclamation Ariz.-Nev. Hoover Dam — Colorado River — 1,250,000 Kw
U. S. Corps of Engineers Ore. Bonneville — Columbia River — 522,400 Kw
Tennessee Valley Authority Ala. Wilson Dam — Tennessee River — 436,000 Kw
U. S. Bureau of Reclamation Cal. Shasta Dam — Sacramento River — 379,000 Kw
Niagara Mohawk Power Corp N. Y. Schoellkopf — Niagara River — 334,800 Kw
U. S. Corps of Engineers Ore. McNary — Columbia River — 286,000 Kw
U. S. Bureau of Reclamation Mont. Hungry Horse — Flathead River — 285,000 Kw
U. S. Corps of Engineers S. C. Clark Hill — Savannah River — 282,000 Kw
Seattle Dept of Lighting Wash. Ross — Skagit River — 270,000 Kw
U. S. Corps of Engineers Ky. Wolf Creek — Cumberland River — 270,000 Kw
Tennessee Valley Authority Ala. Wheeler Dam — Tennessee River — 259,200 Kw
Susquehanna Electric Co Md. Conowingo — Susquehanna River — 252,000 Kw
Safe Harbor Water Power Corp Pa. Safe Harbor — Susquehanna River — 230,000 Kw
U. S. Bureau of Reclamation Ariz. Davis Dam — Colorado River — 225,000 Kw
Source: Federal Power Commission 1955 Annual Report

Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity, Peak—Class 1 Systems, Estimated Dec. '56 Peak (million kw)	May	117.43	116.78	106.32	10.4
	June	97.00	92.6	86.6	12.0
	June	106.06	106.00	103.46	2.5
Production—billion kwhr	May	49.09	47.49	43.35	13.2
Hydro		11.70	11.55	9.81	19.3
Fuel		37.39	35.94	33.54	11.5
Sales—billion kwhr	June	44.53	44.18	40.10	11.0
Residential		10.98	11.02	9.62	14.1
Commercial		7.28	6.74	6.51	11.8
Industrial		23.80	24.04	21.62	10.1
Other		2.48	2.38	2.36	5.1
Fuel Consumption	June				
Coal—million tons		12.34	12.05	11.07	11.5
Oil—million barrels		4.61	4.47	4.69	− 1.7
Gas—billion cu. ft		127.04	110.51	107.42	18.3
Net Income Class A & B Co's—$ million	June	102.20	103.15	92.00	11.1
Residential Customers—millions	May 31	44.87	44.76	43.63	2.8
Revenue per kwhr		2.62¢	2.62¢	2.67¢	− 1.9
Avg kwhr per customer		2,858	2,838	2,637	8.4
Avg annual bill		$74.88	$74.36	$70.41	6.3

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	July	129	141	130	− 0.8
ENR Construction Cost	Aug.	146.0	145.6	140.9	3.6
BLS Cost-of-living	July	117.0	116.2	114.7	2.0
NEMA Sales					
Insulation materials	June	156	158	158	− 1.3
Electric appliances		106	103	118	−10.2
Wholesale prices	May				
Motors and generators		132.1	130.4	120.8	9.4
Transformers and regulators		137.5	135.3	127.3	8.0
Switchgear and fuses		151.2	149.0	135.6	11.5
GNP—annual rate—$ billion	2nd Qtr.	408.3	403.4	387.4	5.4



WHEN MOISTURE PROTECTION IS VITAL

MOLONEY Subway Type Network Transformers . . .
Water-proofed with Asphaltum Paint and Heavy Underseal

Installed in dank, disagreeably moist underground vaults, network transformers must be thoroughly protected against condensation, flooding, sewage, salt, and manufacturing wastes. That's why Moloney Subway Type Network Transformers have thick coats of asphaltum paint and heavy protective underseal *. . . for maximum protection against corrosion.*

Specify Moloney Subway Type Network Transformers. They're engineered to provide dependable, continuous service—for your network system.

ME56-16

Moloney Network Switch saves vault space.

MOLONEY ELECTRIC COMPANY

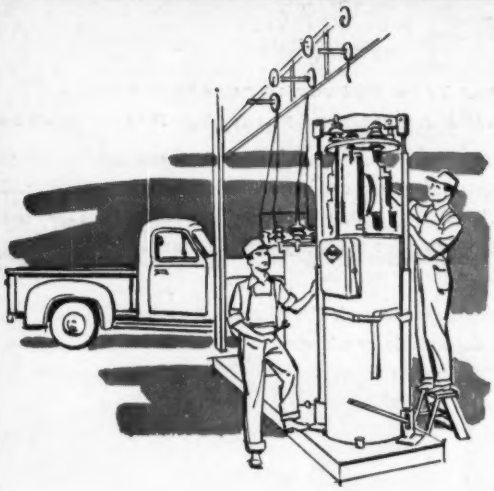
Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers • Network Transformers Series Street Lighting Transformers • Subway Transformers • Industrial Dry Type Transformers • Capacitors • Magnetic Components For Electronics

MOLONEY ELECTRIC

SALES OFFICES IN ALL PRINCIPAL CITIES

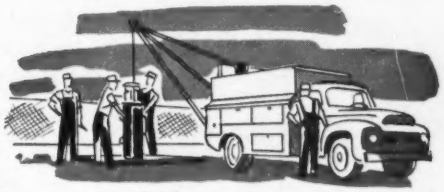
Compare Allis-Chalmers Regulators with Others

Slash Regulator Service Costs 75%



THIS

On-the-spot service with Allis-Chalmers cover-suspended regulators—2-man crew and pickup truck does the job without moving unit.



OR THIS

Other regulators usually require a 4 or 5-man crew and boom truck to move regulator and do piecemeal untanking and retanking.

1—Drain oil from tank

2—Remove cover, bushings and control leads

3—Piecemeal untanking

Eliminates need for moving and piecemeal untanking which costs 4 to 5 times more!

This is the key to savings with Allis-Chalmers regulators! Unit construction makes it possible. A 2-man crew using a pickup truck (not a boom truck) can switch the regulator off the line, set up the portable hydraulic jack and in a few minutes lift the entire regulator mechanism far enough out of the tank for inspection. Only Allis-Chalmers regulators provide full unit construction.

For complete information, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

LIVE BETTER ELECTRICALLY

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